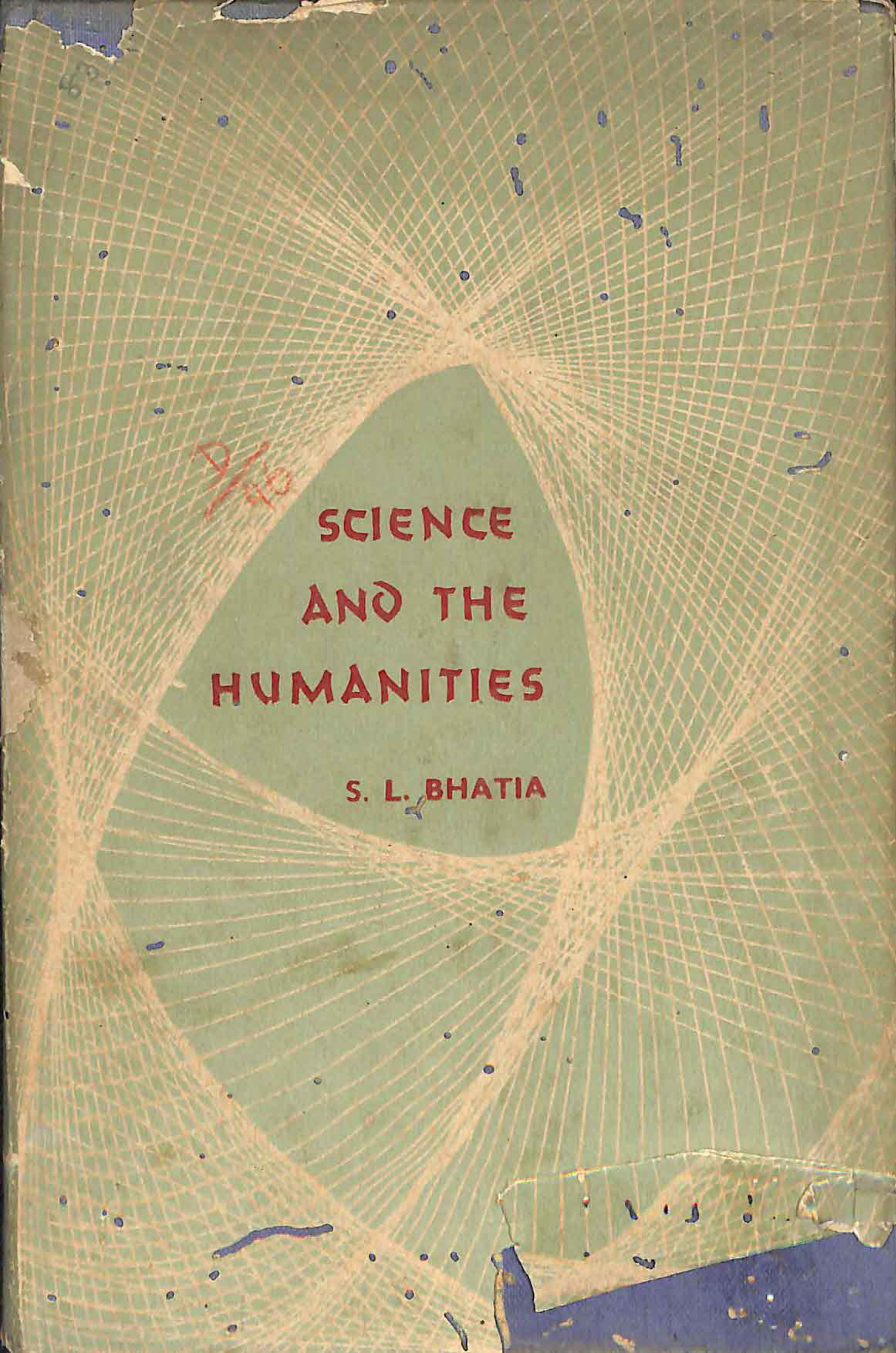

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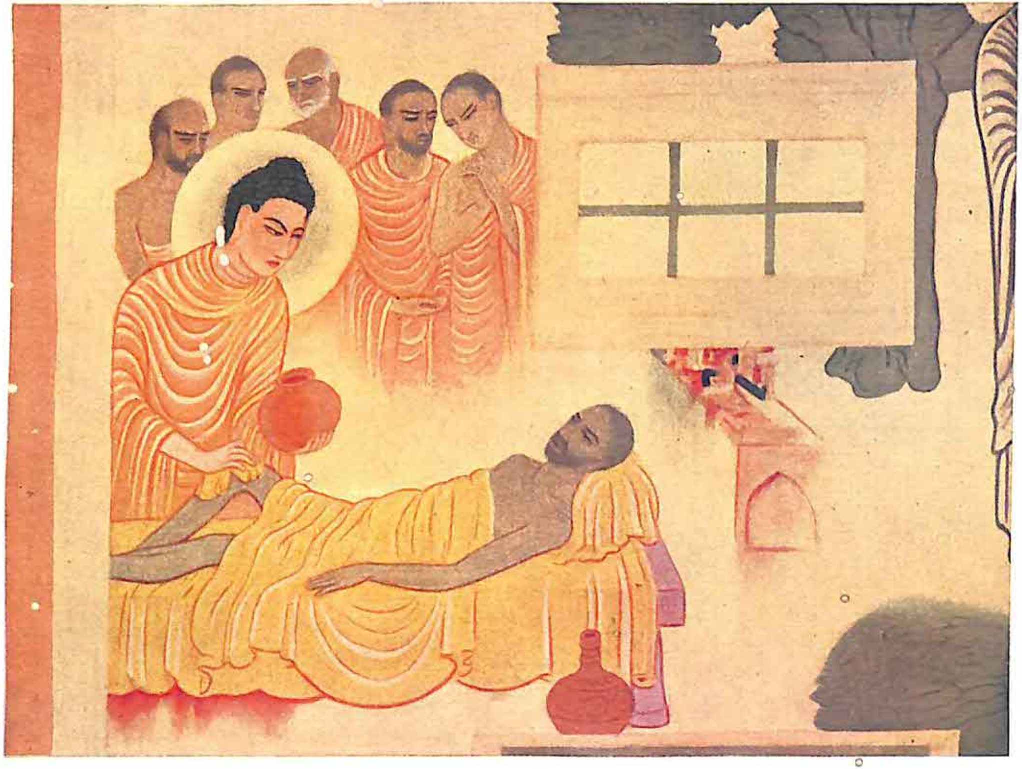
SCIENCE AND THE HUMANITIES

S. L. BHATIA

SCIENCE
AND THE
HUMANITIES



The Buddha Ministers to the Sick and Preaches thereon.

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[Frontispiece

SCIENCE
AND THE
HUMANITIES

BY

MAJOR GENERAL S. L. BHATIA
CIE, MC, MA, MD (Cantab), FRCP (Lond), FRS (E), FASC,
Indian Medical Service (Retired)

WITH A FOREWORD
by
Prof. A. V. HILL, FRS, NOBEL LAUREATE
University College, London.

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Affectionately dedicated
to
my dear father
the late RAI BAHADUR DR. HIRA LAL BHATIA
of Lahore
in tribute to
a great Surgeon and Teacher
in whom were enshrined
the highest ethical principles
of
the profession of Medicine

FOREWORD

HALF a century ago a young man from India came to Cambridge to begin his study of medicine. It happened that I, also quite young, demonstrated to him in the practical class in physiology. Now according to the Hippocratic Oath, the first obligation accepted by a student of medicine is

> to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him and to relieve his necessities if required.

The same sense of obligation to a teacher is inherent in the ethical principles of India; not only in its ancient systems of medicine (going back much further than Hippocrates) as the author of this book insists, but also—as I have continually observed and experienced—in common life. For half a century S.L. has practised these principles towards me, and indeed quite literally, in 1943-44 when I was in India, he shared his substance with me and relieved my necessities. One of those necessities was to know more about the state of medicine and of medical science in India: in this he in turn became my instructor, and from our discussions arose a plan for an All India Medical Centre, which sounds rather like what now exists in Delhi!

For my part, without any special ethical principles but simply because I like him, I have remained in frequent and affectionate contact with him since 1911. Why I liked him directly we met I do not remember and probably never asked: but I have always been fond of soldiers; he looked like a soldier, some of his relations have been soldiers and—as it proved—he did distinguished service as a soldier only a few years later. Perhaps it is because he still feels and thinks like a soldier and has had the experience of two World Wars that he writes so movingly in this book about the necessity of Peace. A great American soldier, General George Marshall, in a lecture[1] in Oslo in 1953, after receiving the Nobel Prize, spoke as follows :

[1] Les Prix Nobel en 1953, p.179. P. A. Norstedt, Stockholm, 1954.

> There has been considerable comment over the awarding of the Nobel Peace Prize to a soldier. I am afraid this does not seem as remarkable to me as it quite evidently appears to others. I know a great deal of the horrors and tragedies of war.... I am deeply moved to find some means or method of avoiding another calamity of war.... The tragedy of the aftermath is almost constantly before me.

The "Marshall Plan" of 1947, which his countrymen supported so nobly, was designed to reduce the aftermath of that tragedy. In the following pages S.L. has much to say on the same topic; and also on the ethical principles of goodwill by man towards man through which, alone, hatred and greed can be avoided, poverty and misery alleviated, and progress, spiritual and material, achieved.

But this foreword is not intended to be a review. I am proud that S.L. invited me to write it, and I am glad that he has put his thoughts together on the countless ways, not only medicine, in which thougtfulness for others, friendship, integrity and compassion are essential ingredients of any, lasting influence for good. Perhaps *homo sapiens*, in his folly, will finally annihilate himself, by allowing passion, jealousy, pride and suspicion to override reason, humility and loving kindness. But perhaps he will pull himself together and pay heed to those, like the author of this book, who urge him to be sensible—or perish.

Two years ago, in Pakistan, I gave a lecture to a medical audience in Karachi. In it, among many other names, I mentioned that of Professor, alias Major General, S.L. Bhatia. Unexpectedly, but to my great pleasure, his name drew long and enthusiastic applause. At the Grant Medical College in Bombay and in the Indian Medical Service he had been the teacher, or the inspiring leader, of many of them. Political barriers had not altered human affection, gratitude and regard. Here were the principles, so movingly propounded in this book, working out in practice.

A. V. Hill,
University College, London.

PREFACE

We are living today in the Atomic Age, which is the direct outcome of the Scientific revolution, which took place after the Renaissance. This is a critical period in human history. We have a number of national groups, which cannot co-exist peacefully, and there is a constant threat of War, which is bound to cause widespread destruction. Actually, there is danger to civilization itself, which may be disrupted completely. We do not know how to deal with this situation. We are on the horns of a dilemma. We are beginning to think beyond the sphere of national groups and consider in terms of a universal human being. The new outlook seeks to produce a synthesis between Science and the ancient philosophical doctrines of humanism. We feel the need of a new culture, which would bring about an understanding between the different ideologies. We should realise that human beings inhabiting different parts of the globe possess diverse cultures and beliefs, which should function together in harmony and peace. There should be no need for any animosity among them. It is a matter of vital importance to have respect for human dignity and to love our neighbours as we love ourselves, if we are to have peace and happiness on the Earth.

The Scientists should realise that their role in the present civilization is vitally important. It is, however, not possible to have a complete knowledge of man, without a proper fusion of scientific outlook with a knowledge of history, philosophy, and Humanities generally. This would probably provide a basis for a wider understanding between political and cultural groups in the World. Such intellectual integration is necessary at the present moment; for I feel that it is only thus that we can develop peace and mutual understanding. A common philospohy for the entire human race, which will appeal to all equally in promoting goodwill and understanding, is what is urgently needed. We must remove fear, distrust and antagonism from the minds of the people.

Such ideas have been uppermost in my mind for some years. After having served in two World Wars and having seen the great havoc caused by them, I have been more than ever convinced that if human beings are to live in peace and if our present civilization is to be rescued from utter disaster, a fundamental change in our mental equipment is necessary. This consists in producing a linkage between the purely scientific outlook and humanistic approach to world problems.

I am sincerely grateful to my esteemed friend Professor A. V. Hill, FRS, Nobel Laureate, who was my teacher at Cambridge, for having written such an excellent foreword to this book, so full of affectionate thoughts and personal reminiscences. I appreciate these more deeply than I can say.

This volume is a collection of essays and speeches covering a period of about fourteen years. The first address on *Science and International Goodwill* was delivered at the UNESCO celebrations in Shillong, Assam, on 29th September 1946, not long after the Second World War, when people's minds were full of the happenings at Hiroshima and Nagasaki. Of the remaining nine speeches, seven were delivered at the Indian Institute of World Culture, Bangalore, one at the Rotary Club of Bangalore, and one at the Maha-Bodhi Society, Bangalore. I am sincerely grateful to all these organisations for their kindness and courtesy, and also for the permission to publish these papers together in the form of a book.

The underlying theme in all the writings is very much the same, namely the urgent need for a synthesis of Science and the Humanities. This is the great need of the hour. There is a certain amount of repetition, but this is inevitable in a collection of speeches such as these.

Finally, I wish to thank Orient Longmans Ltd. for taking keen interest in the publication of the book. My thanks are also due to Mrs. M. C. Gaughan for her valuable clerical assistance in preparing the materials for publication.

The Frontispiece, *The Buddha Ministers to the Sick and*

Preaches thereon, is one of the Mulagandhakuti Vihara Wall Paintings by Kosetsu Nosu, published by the Maha-Bodhi Society, Saranath, Banaras, U.P., to whom, I offer my thanks.

If this collection of writings is helpful to some extent in arousing keener interest in the current world problems, in the dangers that lie ahead, and in the remedies suggested by me to deal with the situation, I shall feel that my labours have been amply rewarded.

TARA KUTIR,
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S. L. BHATIA.

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CHAPTER I

SCIENCE AND INTERNATIONAL GOODWILL*

EVER since a couple of atomic bombs found their way over Japan last year and their consequences and repercussions were brought home to us in a most dramatic fashion, men suddenly began to wonder and ask 'What is this diabolical thing called 'Science'?'

Science is knowledge which is primarily based on facts which are ascertained by observation and experiment. From these facts inferences are drawn and general laws and principles are formulated into which these facts can be fitted in. 'Facts are the air of a scientist', says Pavlov. 'Without them you never can fly. Without them your theories are vain efforts.' Science concerns itself with the discovery of truth. The social importance of science is due to the fact that it enables us to manipulate and gain mastery over nature.

As a factor in human life the role of science is very recent. It begins with Galileo, and has existed for some three hundred years. During the first half of that period, it remained a pursuit of the learned, which did not affect the thoughts or habits of ordinary men. It is only during the last hundred and fifty years, that science has become an important factor in determining the everyday life of people. But these hundred and fifty years of science have proved more explosive than five thousand years of pre-scientific culture. Scientific knowledge advanced rapidly throughout the seventeenth, eighteenth and nineteenth centuries. But it was in the nineteenth century that it really began to affect the lives of men.

Science may be divided into two groups :

(*a*) The physical group comprising Physics and Chemistry. It deals with properties of matter apart from life.

(*b*) The biological group comprising Botany, Zoology, Physiology, etc. Medicine is included in this group.

---

*An address delivered at the UNESCO Celebrations in Shillong, Assam, on 29th November 1946.

It deals with phenomena of life associated with matter.

The effect of biological science on human life has been very small so far. There are of course Darwinism and the idea of Evolution, and these have served as arguments in favour of nationalism. We may, however, expect great effects from this in the near future; for instance there are great potentialities in Mendelism and the study of heredity, so far as the future of the human race is concerned. So far the most effective of the biological sciences has been Medicine on account of its influence on the health of the community as well as of the individual. It has brought many potent means of preventing and curing quite a number of diseases and raising the standard of health.

But it is the physical sciences which have had the greatest effect on the affairs of mankind. It is they which brought about industrial revolution in the nineteenth century. One of the effects of this industrial revolution was to make the entire world an economic unit. Another effect of industrialism is to increase the productivity of labour, and thus make more luxuries possible. In England, its early effects were an increase in population with a lowering in the standard of living. This was followed by a wave of prosperity, when the wages increased and the hours of work diminished, accompanied by expansion of trade.

Modern industrialism produces a struggle between nations for markets and raw materials. This produces international competition. The men of science in different national groups continually produce more and more elaborate methods of attack and defence. It is undoubtedly true that it is science mainly which has determined the importance of raw materials in international competition. Coal, iron and oil are the basis of power and of wealth; they are indispensable in the art of War.

Science has been a great stimulus to the growth of nationalism. Nationalism has grown rapidly because of the increase of large-scale organisation, in which science has materially helped. Without railways, telegraphs, telephones and the radio, the control from the centre would have been very difficult. Modern methods of printing and advertising make the dissemination of knowledge and information easier and quicker. Consequently the Press has become a great force in our present-day civilization. Broadcasting also is fast becoming an important factor in moulding public opinion. All this is due to the scientific development in the purely physical realm. In fairness to the men of science, I must point out that they, unfortunately, pay little heed to the purpose to which their discoveries are put. This application is largely in the hands of politicians and others. Scientists are essentially searchers after truth, and they usually avoid extreme dogmatism. It is the politicians that give colour to their discoveries. As an example, I may quote Bertrand Russel.

> The dispute between anarchism and bureaucracy at present tends to take the form of one side maintaining that we want no organisation, while the other maintains that we want as much as possible. A person imbued with the scientific spirit would hardly even examine these extreme positions. Some people think that we keep our rooms too hot for health, others that we keep them too cold. If this were a political question, one party would maintain that the best temperature is the absolute zero, the other that it is the melting point of iron. Those who maintained any intermediate position would be abused as timorous time-servers, concealed agents of the other side, men who ruined the enthusiasm of a sacred cause by tepid appeals to mere reason. Any man who had the courage to say that our rooms ought to be neither very hot nor very cold would be abused by both parties and probably shot in No-Man's Land. Possibly, some day, politics may become more rational, but so far there is not the faintest indication in this direction.

Scientific inventions facilitate propaganda and centralisation of control, resulting in the formation of groups of human beings, which become very disciplined and very docile to their leaders, whose influence whether for good or for evil is increased. In other words, the advent of a large number of dictators in the world during the last quarter of a century may be attributed perhaps in the last resort to the progress of Physics and Chemistry. There is really nothing wrong in this. But the fact is that these groups are intensely national. Had there been harmony and goodwill between them, all would be well. Each would live and work in its own way, and each would contribute to the sum total of human happiness and culture. This, however, is not so. There has been rivalry between the groups, resulting in terrible disasters. The groups might unite; I sincerely hope they will. But will they? Take the analogy of a football match. The object of a football team is to score goals. If two football teams combined and kicked the ball into the two goals in a given period of time, many more goals would naturally be scored. But who would suggest that this should be done, the object of a football team being not to score goals but to win? Similarly the object of the different groups of human beings is not to score goals but to win, and it is this spirit of rivalry which leads to friction.

When I look at the world today, I cannot help agreeing with Fisher, (the Oxford Historian), when he says that

> in history one sees one emergency following upon another as wave follows upon wave. There is only one great fact with respect to which, since it is unique, there can be no generalisations, only one safe rule for the historian: that he should recognise in the development of human destinies the play of the contingent and the unforeseen. This is not a doctrine of cynicism and despair. The fact of progress is written plain and large on the page of history; but progress is not a law of nature. The thoughts of men flow into the channels which lead to disaster and barbarism.

Men often say that science has been a boon to mankind. But those of us who have lived through two world wars are apt to be a bit sceptical. There is one obvious fact that science in its application may or may not be an instrument for good. In fact, it is actually proving to be a potent instrument of destruction, and its unbridled use in the hands of politicians will desrtoy the world.

Science is used to promote the power of dominant groups rather than to make men happy; and whether it will prove to be a blessing or otherwise is still an open question.

There are two ways in which science may affect human life:

(*a*) Without altering men's passions or their general outlook, it may increase their power of gratifying their desires.

(*b*) It may operate through an effect upon the theological or philosophical conceptions, which are accepted in practice by most intelligent men.

Of these the latter effect is almost negligible; the first is by far the more important.

Beyond actual facts of life and matter with which science deals, there is the question of fundamental values to be attached to existence, which is of the greatest importance in promoting harmony on earth. Here we proceed from the realm of science into that of metaphysics and theology. But a consideration of the value of life on earth and its ultimate destiny can never be ignored, and I hope that scientific outlook will eventually offer a solution to bring about harmony between the various religious faiths. In fact, there is a tendency amongst the more advanced sections of humanity to believe that the different religions are but different paths to one and the same goal. This realisation will again help to promote goodwill, and bring about peace on earth.

Science alone is not, and can never be, a panacea for all the ills with which humanity is afflicted. It is really not diabolical, but a great responsibility rests on those who wield power, for they can by their influence make either good or bad use of the science which is placed at their disposal. A change of heart in them is therefore necessary. It is also necessary that the scientists should assert themselves, and allow their discoveries to be used only for good purposes. A little more of Kindness is needed in this world, a little more of Grace and Charity. Can these qualities come from science ? I wonder.

Speaking as a physiologist, I wish it were possible that some substance, possibly of the nature of a hormone, could be injected into the blood of mankind, which would fill them with kindliness towards their fellow-men. It is only kindliness and benevolence that can save mankind.

A question arises: what can be done to promote mutual goodwill amongst the nations? To bring about this, a better knowledge of each other is essential.

It is possible to establish friendly relations between the Universities and other learned institutions in India, with corresponding bodies in Great Britain, the United States, and other countries. During my visit to the United States and Canada last year as a member of the Indian Scientific Mission, I discussed this matter with several persons and the suggestion was welcomed in many places especially in Toronto.

By establishing such contacts between the cultural institutions in different countries in this way, it will be possible to increase mutual goodwill and co-operation. It is one of the simplest and best methods of promoting international friendship by personal friendship.

Medicine as a science stands on a higher pedestal than pure physical science so far as the welfare of humanity is concerned. In a memorable address delivered at the commencement of this century, in January 1901, Sir William Osler said:

> For countless generations the prophets and kings of humanity have desired to see the things which men have seen, and to hear the things which men have heard in the course of the wonderful nineteenth century. To the call of the watchers on the towers of progress, there had been the one sad answer—the people sit in darkness and in the shadow of death. Politically, socially, and morally the race had improved, but for the unit, for the individual, there was little hope. Cold philosophy shed a glimmer or light on his path, religion in its various guises illumined his sad heart, but neither availed to lift the curse of suffering from

the son of Adam. In the fullness of time, long expected, long delayed, at last Science emptied upon him from the horn of Amalthea blessings which cannot be enumerated, blessings which have made the century for ever memorable; and which have followed each other with a rapidity so bewildering that we know not what next to expect. To us in the medical profession who deal with this unit, and measure progress by the law of the greatest happiness to the greatest number, to us whose work is with the sick and suffering, the great boon of this wonderful century, with which no other can be compared, is the fact that the leaves of the tree of Science have been for the healing of the nations. Measure as we may the progress of the world—materially, in the advantages of steam, electricity, and other mechanical appliances; sociologically, in the great improvement in the conditions of life; intellectually, in the diffusion of education; morally, in a possibly higher standard of ethics—there is no one measure which can compare with the decrease of physical suffering in man, woman and child when stricken by disease or accident. This is the one fact of supreme personal import to every one of us. This is the Promethean gift of the century to man.

These are noble words and noble sentiments: they represent typically the complacent mood of the nineteenth-century science. Since then much water has flowed under the bridge. In spite of all vicissitudes, I am glad to say that Medicine has continued to make good progress and the expectations of Osler have been fully justified. In fact, during the two World Wars many important discoveries have been made in medical science for the alleviation of human suffering. We of the medical profession, who worship at the shrine of Aesculapius, have remained true to our oath of allegiance to alleviate suffering, and have not allowed our efforts to be diverted to nefarious ends.

Love of knowledge, a keen spirit of enquiry and the pursuit of truth are the foundations of scientific endeavour and progress, and their essential purpose is the welfare of mankind. As an accompaniment to this scientific progress, there is need for a new moral outlook which would show respect for what is best in man.

It is to cultivate this new moral outlook as well as to emphasise the international aspect of science, which recognises no boundaries of race, creed or colour, that we hold today the inaugural celebrations of the United Nations Educational, Scientific and Cultural Organisation. I wish this world organisation the best of luck, and all the success it so richly deserves.

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CHAPTER II

SCIENCE AND THE FUTURE OF CIVILIZATION*

EVER since I came to Bangalore last May I have been deeply interested in the work of the Indian Institute of Culture, and I regard it as both a privilege and a pleasure to speak on this platform.

It is with some diffidence that I have selected *Science and the Future of Civilization* as my subject. I, however, make no apology for this selection, for is not the question of the future of civilization worrying most of us in these troubled times ? What is to be the fate of civilization, if science continues to advance, and if some of the scientific discoveries, like the atom and hydrogen bombs, are employed for the destruction of the human race, rather than for its welfare ? The consequences would be so grave that we are filled with hororr at the very thought of them. In our desperation, we look for some merciful way out of this *impasse*: and any attempt at finding a solution, however modest it may be, is worth while. Unfortunately the atmosphere today is surcharged with fear and mistrust among nations, but some light on the horizon is dimly visible.

Science is not a new thing; it had its origin in the remote past. India, China, Arabia, Asia Minor, Egypt, Greece, and Italy, have made important contributions to it in the old days. It is a part of the continuous history of mankind from ancient times. In studying it, however, it is necessary to have some landmarks. As a medical man, I may perhaps be forgiven if I choose a date which is important in the history of medicine but which is also a landmark in the history of science generally: the year 1543.

In this year 1543, Andreas Vesalius published in Basle his book *De Humani Corporis Fabrica* (On the Structure of the Human Body), which marks an epoch in the history of medicine and of science. Why does it mark an epoch ? The answer is beautifully given by Sir Michael Foster. According to him, prior to Vesalius the position was somewhat like this:

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*An address at the Indian Institute of Culture, Bangalore, on 26th July, 1955.

> In the times of the Greeks, mankind had made a fair start in the quest of natural knowledge, both of things not alive and of things living; the search had been carried on into the second century of the Christian era, when Galen expounded the structure and the use of the parts of the body of man. As Galen passed away, enquiry, that is to say, enquiry into natural knowledge, stood still. For a thousand years or more the great Christian Church was fulfilling its high mission by the aid of authority; but authority, as with the growth of the Church became more and more potent as an instrument of good, became at the same time more and more potent as a sterilizer of original research in natural knowledge. The church held the gates of learning, and they who entered were bidden to tread her path and hers alone. Her methods became the methods of all scholars. . . . .The pursuit of truth ceased to be the looking into the phenomena of nature and the seeking for the reason why; it narrowed itself to asking what the teachers taught. The method which had proved triumphant in the search after things spiritual was taken to be the method of all enquiry, and biologic enquiry was no exception. As the Holy Scriptures were the bible for all men, so the works of Greek and Latin writers became the bible for the anatomist and the doctor. Truth and Science came to mean simply that which was written, and enquiry became interpretation.

Andreas Vesalius was a Belgian, who was born at Brussels in 1514. He studied at the University of Louvain, and later in the University of Paris at the feet of the famous Sylvius. He was subsequently made a Doctor of Medicine of the University of Padua, and appointed Professor of Surgery in charge of Anatomy at that University. Here he taught anatomy in his own way by dissection of the human body and not merely by narrating what Galen had written. He thus introduced into Medicine the spirit of direct enquiry, the method of observation as against interpretation.

The work of Andreas Vesalius was thus a revolt against authority as the guide in knowledge. He shattered the idol of authority in anatomical science for all time.

The year 1543 is also important in the history of science. In that year was published Copernicus' great work *De Revolutionibus Orbium Cœlestium*, in which he gave a new interpretation of the skies, and postulated the movement of the earth. Copernicus was also at Padua.

Following the tradition laid down by Vesalius, there is the famous name of William Harvey, who was the first to demonstrate the circulation of blood in man. He was born at Folkestone in 1578 and was a student first at Cambridge, and then at Padua. When Harvey reached Padua in 1598, Galileo was there as Professor, and was making his immortal discoveries in physics and astronomy. He founded the new school of exact and mathematical physical science, which had a profound effect on the history of human thought. His investigations covered not only the realm of the sun and stars, but also the working of machines and the fundamental properties of matter.

Padua University thus took a leading part in the revival of learning in the sixteenth century.

The sixteenth century, especially the year 1543, was a notable period in the history of Europe. These were stirring times and there were strong undercurrents of thought. The Reformation was abroad. Luther was living his last years—he died in 1546—and Calvin was strong at Geneva; but the order of the Jesuits was already in existence and the Inquisition held Spain in its grip. It was the heyday of art. Though Raphael had been dead for three and twenty years, Michelangelo had nearly as many yet to live, and Tilian was in his prime. The great exponent of one of the oldest of sciences, astronomy, Nicolas Copernicus, closed his eyes in this very year. The new learning was everywhere working like leaven. The old universities were expanding, and new ones were springing up everywhere. The worth of the Greek tongue was preached by the learned. Moreover, learning was being spread as well as made; printing in Europe had seen its hundredth birthday, and the presses of Vienna and other cities were pouring forth the means of knowledge. The night of the Middle Ages had passed into the dawn of modern times. Further, the spirit of adventure was in the air. Some twenty years before, Cortez had conquered Mexico; some ten years before, Pizarro had laid hold of Peru.

It was in such exciting circumstances that the spirit and work of Vesalius, Harvey, Galileo, Copernicus and others contributed to the European Renaissance in the sixteenth and seventeenth centuries—a new era in human thought and science, as we know it today. Science may thus be said to have commenced its fruitful career about four hundred years ago. The scientific revolution which took place in Europe in these centuries will count amongst the great adventures, which have helped the advancement of the human race. It has affected the inhabitants not only of Europe, but of all parts of the globe.

This Scientific Revolution led to the Industrial Revolution; the two are closely interrelated, and form part of one movement which has changed and is changing the face of the earth. This change has been accelerated, decade by decade. In the first half of the twentieth century, it gained a previously undreamt-of terrific momentum. The result was the emergence of a kind of Western civilization which has cut itself away from the Greco-Roman heritage, and even away from Christianity itself. It is, however, no longer confined to the West, but is also profoundly affecting the lives of the people living in the East, and all other parts of the earth.

Men have been anxious to apply this science to promote human happiness and welfare. Francis Bacon always laid stress on the immense utilitarian possibilities of science. Science has undoubtedly great potentialities and has proved of great service to mankind, as in food production, nutrition, the cure and prevention of disease, healthier conditions of work and play, industrial production, the production of power, engineering, rapid means of transport and communication, and so on. For the progress of science an original and enquiring bent of mind is essential, but it has ceased to be the occupation of a few; science has become an enormous organization today and is supported by the State and by industries on a big scale.

India has a fine record of scientific work to its credit. Many distinguished Indian scientists have made contributions to it. We have some very fine Science institutes and laboratories in India, which have done and are doing excellent work. During the last few years about seventeen new National Laboratories have been established in different parts of the country. We have certain important organizations whose function is to promote and encourage scientific research, *namely* The Indian Science Congress, The Indian Council of Medical Research, The Council of Scientific and Industrial Research, the Indian Council of Agricultural Research, etc. Apart from scientific research in universities, colleges and in especially set-up research laboratories, a certain amount of research is conducted also by some of the industries. Bangalore occupies a very distinguished position in the field of scientific research by virtue of the Indian Institute of Science, the Raman Research Institute and others. All this is to the good, but there is no room for complacency here. We have persistently to pursue this work on an increasing scale, for science does undoubtedly play an important part in relieving the distress caused by disease and poverty, in raising the standard of health and in promoting the happiness of the people.

India is playing an important part, especially in using the atom for peaceful purposes. This work is under the supervision of the Indian Atomic Energy Commission. The Tata Institute of Fundamental Research at Bombay is the principal nuclear research centre in India. The Institute of Nuclear Physics and the Bose Research Institute in Calcutta, the Indian Institute of Science in Bangalore, etc., are some of the other centres where this work is in progress.

It is gratifying that India's policy in regard to scientific research is most praiseworthy, as we have been striving to develop science especially for the welfare of mankind. All honour to our dear Prime Minister, Pandit Jawaharlal Nehru, who has not only been promoting goodwill amongst nations, thus reducing world tension, but has also been pioneering the advancement of science in his own motherland, especially for peaceful ends. In this he has set a noble example, of which we may justly be proud. Recently he has said quite rightly that underdeveloped countries like China and India cannot attain a high standard of living on the basis of coal and oil alone and that the only solution to this difficulty is offered by atomic energy.

So far as the peaceful uses of atomic energy are concerned, the United Nations has adopted a proposal for establishing a new international agency for international co-operation for this purpose. An international conference is to be held at Geneva from 8th to 20th August 1955, when scientific delegates from some eighty countries will meet to study the technical and scientific factors involved and to explore the means required to develop atomic power for peaceful purposes on an international scale. Dr. H. J. Bhabha, a distinguished Indian scientist, is the President of this Conference, from which great results are expected.

Scientists are interested primarily in the discovery and pursuit of Truth, and not in its application. As an example of this, I may refer you to the *Conversations* of the Royal Society of London, which were held in London on 19th May 1955, when exhibits intended to illustrate some of the more important lines of research were displayed in the Society's rooms. These included the song of birds and the music of the spheres (detected by radio-telescope), the hearing of whales and the spinning of spiders' webs—subjects which have no special significance so far as their application for practical purposes is concerned.

But science, unfortunately, plays both a constructive and a destructive rôle in society. Because of the destructive use of science, now and then voices are raised asking for the cessation of scientific research in order that civilization may be saved from utter annihilation. But it is not science which is to be blamed for this; it is the political and military effects of the application of scientific discoveries.

The application of scientific discoveries can be controlled only by moral forces. As Professor A. V. Hill quite recently said:

> It depends on the corporate sense of ordinary men of what is fair and decent, or bad or unjust. . . .It is no good asking the scientists alone to provide such ethical control, or the technologists. It is useless to demand that nuclear energy should not be developed, lest its products be used as bombs. It is senseless to argue that Microbiology should be stopped for fear of biological warfare, that public health should not be advanced because it will lead to overpopulation and famine, that control of human fertility should not be sought if that offends some people on religious grounds, or that communications should not be improved because they allow the spread of propaganda and disorder. Research and its application will certainly continue.

It is a hopeful sign that certain voices are being raised against the destructive uses of scientific discoveries; and it is to be noted that scientists themselves are most emphatic in making this protest.

You are no doubt aware that Lord Russell has recently started a campaign for peace. A declaration, signed by himself, Einstein, and some other distinguished scientists, draws attention to the tragic situation which confronts humanity, and says that scientists should assemble in conference to appraise the perils that have arisen from the development of weapons of mass destruction. They warn us, that the continued existence of the human race is in doubt. The new bombs are more powerful than the old. While one atom bomb could obliterate Hiroshima, one hydrogen bomb could obliterate the largest cities, such as London, New York and Moscow. The damage possible is even greater than this: the Bikini tests have shown that nuclear bombs can gradually spread destruction over a very much wider area than was originally expected, and the best authorities are unanimous in saying that a war with hydrogen bombs might put an end to the human race. The problem facing us is, therefore: Shall we put an end to the human race or shall mankind renounce war ? The statement says:

> Most of us are not neutral in feeling, but as human beings, we have to remember that if the issues between East and West are to be decided in any manner that can give any possible satisfaction to anybody, whether Communists or Anti-Communists, whether Asian or European or American, whether White or Black, these issues must not be decided by War.
>
> We should wish this to be understood both in the East and in the West.
>
> There lie before us, if we choose, Knowledge and Wisdom. Shall we instead choose death, because we cannot forget our quarrels ?
>
> We appeal as human beings to human beings: Remember your humanity, and forget the rest. If you can do so, the way lies open to a new paradise; if you cannot, there lies before you the risk of universal death.

The Statement finally ends in an appeal to all scientists of the world and the general public to subscribe to the following resolutions:

> In view of the fact that in any future World War nuclear weapons will certainly be employed and that such weapons threaten the continued existence of mankind, we urge the governments of the world to realize and to acknowledge publicly that their purposes cannot be furthered by a World War, and we urge them consequently to find peaceful means for the settlement of all matters of dispute between them.

This announcement by Lord Russell and other scientists is most timely and, as far as I can see, there cannot be the slightest objection to the Resolution they have proposed, to renounce war, and to settle all differences by peaceful means. I am sure all those present here would support it.

As you are no doubt, aware, scientific method consists in examining the facts of nature by observation and experiment, in drawing rational inferences from them and then correlating them so as to form general laws. Science has faith in the intrinsic unity of nature, and its aim is to discover all-prevading laws.

In the task of social reconstruction which confronts us today, the scientific method has a great contribution to make, its great advantage being that it applies reason to the understanding of the external world. To this we owe largely the advance in civilization which has taken place.

The problems of today are different, as they deal with certain ethical aspects of technological advance and in the ethical sphere a further contribution is necessary. Opinions will probably differ widely, even amongst scientists, as to what contributions the scientific attitude of mind can make to ethical problems. If civilization is to continue to advance, and if full use is to be made of opportunities for the richer life which technical advances present, science must join hands with religion in thinking out what those possibilities are; for it is after all from religious teachings that the highest ethical principles are derived and they make the strongest appeal to us. Up to the present, it must be said, the scientists have generally lived in a small world of their own and their collaboration in the general cultural activities has been very small.

Some people think that science is ethically neutral. This is not so. The contribution which science has to make to ethics is very much greater than is usually understood. For instance, it was the scientists, not the non-scientific men, who protested against the use of the atom bomb on Hiroshima and Nagasaki before the Japanese had been warned. It is obvious that it is the scientists who, by virtue of their technical knowledge, know fully the harmful effects of the applications of their discoveries: and they can play an important part in deciding how these discoveries can be incorporated in the social life of the people.

Owing to the lack of goodwill and the mistrust which prevails among nations some scientific discoveries are used for political and military ends. This can be avoided only if the differences among nations are resolved by peaceful means and there is goodwill among them. To promote goodwill in all sections of the human race, a complete change of heart is necessary.

In all our actions we are guided by our conscience. It is our first Master. This is, if I may say so, the voice of God in us. The highest moral principles enshrined in our conscience are derived from the teachings of our great religious instructors. Conscience should guide us in our dealings with all human beings of whatever colour or creed they may be. But at present the spirit of nationalism, unfortunately, serves as a limiting factor in all our dealings. We should extend our moral horizon so as to encompass the entire human race so that the conscience of the individual becomes the conscience of humanity. This would be no less than a revolution in the ethical sphere. It would be in logical sequence to the Renaissance, which resulted in the Scientific and Industrial Revolutions. It is up to us to bring about this change; for the very existence of the civilization of which we are so proud, and even the survival of human life on this earth, is at stake.

In order to bring about this change it is essential to have a wholesome synthesis of science and religion. We should realize that science is not opposed to religion, or religion to science. The two are complementary. I am not speaking now of any particular religion such as Hinduism or Christianity or Buddhism or Islam. To my mind the highest ethical principles taught by all great religious teachers are the same. They are all but different paths leading to the same goal. There should be no quarrel on any religious grounds whatsoever. There is a Unity of religions, which we should learn to appreciate. In fact, nowadays educated men the world over are beginning to realize the similarity of the highest teachings of all religions. Nothing could bring humanity closer together than the attitude of mind which would pin its faith to Universal Brotherhood, which is taught by all religions and without which no goodwill among nations is possible. I feel that India may possibly take the lead in bringing about this synthesis of science and religion, which is so urgently called for. May I say that the scientific attitude and the religious frame of mind have much in common, for they are both searching for Truth ?

Let us for a moment see how religion helps us in this matter. An essential condition for the promotion of universal goodwill is that we should not be so ready to find fault with our neighbours, knowing that we are not free from faults ourselves. Says Lord Jesus Christ in the Sermon on the Mount:

> Judge not, that ye be not judged.
>
> For with what judgment ye judge, ye shall be judged; and with what measure ye mete, it shall be measured to you again.
>
> And why beholdest thou the mote that is in thy brother's eye, but considerest not the beam that is in thine own eye?
>
> Or how wilt thou say to thy brother, Let me pull out the mote out of thine eye; and, behold, a beam is in thine own eye?
>
> Thou hypocrite, first cast out the beam out of thine own eye; and then shalt thou see clearly to cast out the mote out of thy brother's eye.

This applies with as much force to individuals as to nations. We must be charitable to all, for it is out of charity that goodwill arises.

I need hardly remind you that one of the fundamental teachings of Buddhism is that we must be compassionate, not only to all human beings, but to all living creatures. 'How does a monk become a partaker of Uprightness ?' asks Lord Buddha. The answer is:

> A monk abstains from killing living creatures; he lays down the stick; he refrains from causing the death of living creatures; he lays down weapons. He is compassionate and tender-hearted; he seeks with friendly spirit the welfare of all living things. This is the part of his uprightness.

Let a man abstain from unkindness to his fellow men.

The seeds of kindness, gentleness and compassion, which are lying dormant in his nature, will begin to grow spontaneously. By self-discipline we must tread that path, with our conscience as our guide. 'Therefore, O Ananda,' says Lord Buddha, 'Be ye lamps unto yourselves. Be ye a refuge to yourselves. Betake yourselves to no external refuge. Look not for refuge to any one except yourselves.'

Much good can result from the practice of noble teachings such as these. As an example—when my friend Professor A. V. Hill came to India during the last war he told me that a very happy relationship existed between King's College, Cambridge, and Berkeley College, Yale. It is a purely informal arrangement but is greatly appreciated by both the parties to it. They call it *Amicabilis Concordia*. When a member of the staff or student Berkeley College goes to Cambridge he is accepted as a member of the family by King's College. When a King's man goes to Yale he is made to feel at home at Berkeley College. When the Provost of King's College goes to New Haven he is received with honour by the Master of Berkeley College and vice versa. This is a very happy arrangement which promotes international goodwill. We should have many such *Amicabiles Concordiæ* in all spheres of activity between different countries. They would help to resolve many of our differences in an amicable manner.

In conclusion may I say that science knows no barriers either of race, nationality, language, creed or colour? It is international in the truest sense of the word. For this reason, if for no other, it is well worth while to pursue it. It has proved of great service to mankind, and can continue to play a great part in relieving the distress caused by disease and poverty, and in promoting the happiness of the people. The ultimate aim of science is the welfare of mankind and it should be used for this purpose only, and not for destructive purposes. It is only by the use of moral forces that the use of science can be adequately controlled. Scientists are now raising their voices against its destructive use, and they should be given all possible support. It is necessary that science and religion should get together if our civilization is to survive and to continue to advance. We must appreciate the Unity of all religions.

It is my firm conviction, and I cannot emphasize it too strongly, that the ultimate aim of religion is the same as that of science, *namely* the relief of suffering and the promotion of happiness. Says Bhagavan Krishna in the *Bhagavad-Gita* (*The Song Celestial*) :—

> But for earthly needs
> Religion is not his who too much fasts
> Or too much feasts, nor his who sleeps away
> An idle mind; nor his who wears to waste
> His strength in vigils. *Nay,—Arjuna, call*
> *That the true piety which most removes*
> *Earth-aches and ills*, where one is moderate
> In eating and in resting, and in sport;
> Measured in wish and act: sleeping betimes,
> Waking betimes for duty.

This is a great message for all humanity and we should all do well to listen to it with care and devotion. In the application of science we should be guided by the universal ethical teachings of Religion.

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CHAPTER III

SCIENCE AND THE HUMANITIES*

THE subject which I have chosen in a rash moment for this evening's talk is no less than 'Science and the Humanities'. There is some justification for selecting it, for I feel that among the new vistas and new horizons that we witness today in the pursuit of Science the one that gives the greatest hope and comfort to humanity is that in which there appears to be a suitable blending of Science with the Humanities.

The modern age of Science may be said to have commenced its fruitful career about three hundred years ago. Since then, there has been a progressive subjugation of nature. There was the steam-engine, which has been replaced by the dynamo. Radiant energy has revealed the hidden secrets of matter. The conquest of the Earth has been accompanied by the mastery of the sea and the control of the air so that distance has been annihilated and communications have been accelerated beyond all expectations. This is not all. Epidemics have been checked. We have more effective weapons, both medical and surgical, for curing disease. The general standard of health has improved, and the expectation of life has lengthened. Besides, the means of industrial production have improved, and there is an all-round betterment in the economic condition of people.

There is, however, a dark side to this picture also. Some of us during our lifetime have witnessed two World Wars of unprecedented magnitude, and even today there is no peace among nations. The atmosphere is surcharged with international mistrust and ill-will. Science, in spite of the great progress it has made, has provided no satisfactory remedy for this. On the contrary, the misuse of scientific discoveries for military and political ends has created world-wide fear and a sense of insecurity.

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* An address delivered at the Rotary Club, Bangalore, on 27th February 1956.

In 1939, when the Second World War commenced, H. G. Wells wrote a well-known book *The Fate of Homo Sapiens*, in which he takes pessimistic view of man's future. It would be interesting to know what he has to tell us about this. After recounting the achievements of science and the rapid progress, which had taken place in the course of a single lifetime, he says, that so far as economic circumstances go, the world could be organised to provide every living soul upon it with abundant food, housing and leisure, and that without either direct compulsion to toil or any irksome monotony of employment. In 1888 the Unity of the world as one community was a remote aspiration, now it has become an imperative necessity.

> . . . .And now suddenly, we are confronted with a series of distresses and disorders of a nature to convince the most hopeful of us that all this happy assurance was premature. We anticipated too easily, too greedily, and too uncritically. These new powers, inventions, contrivances and methods are not the unqualified enrichment of normal life, that we had expected. They are proving dangerous and devastating in our eager but unprepared hands. We are only beginning to realise that the cornucopia of innovation may perhaps prove far more dangerous than benevolent.

There have been stirrings of conscience in the scientific world upon the misuse of Science and how far the man of science may be held responsible for that misuse. Now the Scientists themselves are gathering courage to raise a protest against this misuse. 'It would carry us too far afield', says Wells, 'to discuss here how far the consciences of men of science may be able to get the upper hand of a trained and experienced governing class, so as to insist upon such collective ideals as they are able to formulate, and how far a trained and experienced governing class may manœuvre this medley of distressed and protesting intelligences into the position of a roster of mere "experts", available if called upon by the authorities, and otherwise, out of consideration.' To him the odds seem to be in favour of the latter possibility. He continues:

> Plainly it is high time we looked more closely into the cause of these disconcerting frustrations of our recent large bright aspirations of a world of plenty and expansion. What is the real position of '*Homo Sapiens*' in relation to his environment? Has he the mastery we assumed he had, or did we make a profound miscalculation of his outlook? Have we been indulging in hopeful assumptions rather than facing realities of his case!

After an exhaustive discussion of the whole problem, he comes to the conclusion that there is no creed, no way of living left in the world at all, that really meets the needs of the time. When we come to look at them coolly and dispassionately, he says, all the main religions, patriotic, moral and customary systems, in which human beings are sheltering today, appear to be in a state of jostling and mutually destructive movement, like the houses and palaces and other buildings of some vast sprawling city overtaken by a landslide. To the very last moment, in spite of falling rafters and bulging walls, men and women cling to the houses in which they were born and to the ways to which they have grown accustomed. And when at last they realize the inevitability and universality of disaster most of them have become too frantic to entertain the bare possibility of one supreme engineering effort that might yet intercept those seeping waters that have released the whole mountain side to destruction. Such a salvaging of the species *Homo Sapiens* is still possible—that is as much as the most hopeful mind can say.

And finally, he concludes that if *Homo Sapiens* is such a fool that he cannot realise what is before him now, and set himself urgently to save the situation, while there is still some light, some freedom of thought and speech, some freedom of movement and action left in the world, can there be the slightest hope that, in fifty and hundred years hence, after he has been through two or three generations of accentuated fear, cruelty and relentless frustration, with ever-diminishing opportunity of apprehending the real nature of his troubles, he will be collectively any less of a fool ? Why should he undergo a magic change when all the forces within him as without are plainly set against it ?

There is no reason whether to believe that the order of nature has any greater bias in favour of man than it has in favour of ichthyosaur, or pterodactyl. In spite of all my dispositions to a brave-looking optimism, I perceive that now the universe is bored with him, is turning a hard face to him; I see him being carried less and less intelligently and more and more rapidly, suffering as every ill-adapted creature must suffer in gross and detail, along the stream of fate to degradation, suffering and death.

I have purposely given you at some length the view of H.G. Wells which he expressed in 1939 when the Second World War commenced. Most of his views and prophecies have unfortunately proved to be true in the light of subsequent events.

I do not share the pessimism of H. G. Wells, for I feel that ultimately the good sense of humanity will prevail and avert this terrible catastrophe. But I do think that a stage has now been reached when we must give up our mood of complacency and become fully alive to the dangerous situation which confronts us. It is one of the great sorrows of this age that Science though primarily meant for human welfare is used for the destruction of mankind. We must all realise it as our sacred duty to redeem Science from this disgrace, and proclaim that scientists are out to discover the secrets of life and not the secrets of death. It is an error to think that the mental attitude engendered by Science leads to gross materialism. On the contrary, in their search for Truth the scientists are as much religious in their outlook as the priests themselves. Still there is no gainsaying the fact that in the world today, materialism is rampant, and we wonder whether Science, as the embodiment of mechanical force, can rule without invoking utter ruin. Two things are clear: (i) that there must be a very different civilization or there will be no civilization at all, and (ii) that individually neither the old learning nor the new Science alone would suffice to save mankind.

European civilization has its roots deep in the soils of Greece and Rome. Much of the religion, practically all the philosophies, the models of literature, the ideals of democratic feeedom, the Fine and Technical Arts, the fundamentals of Science and the basis of law—all these have their origin in Rome and Greece. Revival of this ancient learning occurred in Europe during the Renaissance. Later with the development of Science, a cleavage between Science and the Humanities took place, which reached its climax about half a century ago. This civilization is no longer confined to Europe and is profoundly affecting the rest of the world.

The Humanities bring the student into contact with the master minds of the past, and they serve as an excellent discipline for the mind. Today Science sadly lacks the Humanities, and Humanists have not enough Science. This unhappy divorce should never have taken place. They are complementary with each other. In the remembrance of their glorious past, nations as well as individuals derive their noblest inspiration. India with its ancient spiritual heritage and tradition has a great contribution to make in this field.

The salvation of Science lies in the recognition of a new philosophy—of which Plato speaks: 'Now when all the studies reach the point of inter-communication and connection with one another and come to be considered in their mutual affinities, then I think, and not till then will the pursuit of them have a value.' This inter-communication, this synthetic process between Science and the Humanities, I can hardly overemphasize.

We all nourish the unconquerable hope of a world which would consist of ideal states whose citizens are happy, wise, brave, just and self-controlled, all at peace and unity with one another and in the enjoyment of equality, liberty and fraternity. But the 'States are as the men are, they grow out of human characters.' The true state is within us, of which each one of us is the founder.

The essential thing is that we should first remove the atom and hydrogen bombs from our minds, as our Prime Minister Pandit Jawaharlal Nehru said the other day in his Inaugural Address at the Indian Science Congress at Agra. Once this is done it will be easier to remove the actual physical atom and hydrogen bombs from the world.

It is essential that goodwill should prevail among nations as amongst individuals. For this purpose a complete change of heart is essential. In all our actions we are guided by our conscience, in which are enshrined all the highest ethical and moral principles. Our moral horizon should merge with that of Science, and should encompass the entire human race so that the conscience of the individual becomes the conscience of humanity.

There are two important elements in human progress, *namely* the development of ethical values and the mastery of the physical world. The development of ethical values is one of the promising and fundamental ways of fulfilling the aims and possibilities of life. Of equal importance is the mastery of the physical world to give men a good environment to work in, suitable and effective weapons for their work, and enough food. But is it not written that man shall not live by bread alone ? These two elements, therefore, must go hand in hand, for it is on the co-ordinated development of the two that the welfare, safety and progress of humanity depend. Otherwise, we are surely heading for disaster. Biological science and specially Medicine has widened the thoughts of men in its application to social problems, and it may be a binding factor in this process of synthesis.

There is only one alternative to the tragic fate which awaits mankind, and that is deliberate and strenuous adaptation by re-education of our species, education in the fundamental, scientific as well as moral principles, which proclaim mutual love, faith and charity amongst all members of the human race. This is the new and widening horizon in Science, which is dimly visible. And we as Rotarians, as the followers of a new humanitarian movement which believes in Service before Self and Universal Brotherhood, and which encircles the entire globe and knows no distinction of race, creed, colour or language, can play a very effective and honourable part at this juncture, and thus help to create a new heaven and a new earth.

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CHAPTER IV

THE TRUE PHILOSOPHY OF ACTION*

Two remarkable statements recently appeared almost simultaneously in the press, one from Nizamabad in the neighbouring state of Hyderabad, the other from Rome, both of which are of profound interest.

The Prime Minister, Shri Jawaharlal Nehru, in his Presidential Address at the Fourth Convention of the Bharat Sevak Samaj at Nizamabad, asked the people to create a new atmosphere in which manual work would be invested with dignity. In India, he said, manual work was still held in contempt. If India was to fulfil its Second Plan target, a new climate should be created in which work would be given an honourable status and dignity. He thought that the Bharat Sevak Samaj, which had already launched successful experiments in the Kosi and Jamuna project areas and proposed to extend such experiments to other projects like the Nandikonda one, could contribute a great deal to the creation of such a climate. The Prime Minister referred to Russia and the United States of America, which, though poles apart ideologically, had one thing in common. Both these countries worshipped work and hence were bursting with vitality. Their attitude to work had contributed to their remarkable economic development.

The other statement was made by Pope Pius XII when, in Rome, he addressed the Vatican Diplomatic Corps, who presented to him a collection of books in many languages on the occasion of his eightieth birthday. He said that to base the security and stability of human life on the purely quantitative growth of material wealth was to overlook that man was primarily a soul 'responsible for his actions and his destiny'. Man should remember that economics and technology were useful and even necessary forces, provided they remained subservient to the higher requirements of the spirit. They became dangerous and noxious when given undue importance and the value of ends in themselves.

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*An address delivered at the Indian Institute of Culture, Bangalore, on 15th March 1956.

Both Pope Pius XII and Shri Jawaharlal Nehru have given expression to views of profound significance, and both statements contain vital truth. It is my purpose to consider both these points of view and to suggest that the true philosophy of action consists in their wholesome combination and synthesis.

It is commonly said that in the history of human culture Europe represents the intellectual, while Asia represents the spiritual, side. These two streams of thought have met occasionally with mutual advantage. These contacts have taken place at intervals for many centuries. But the two streams of thought are brought together today more closely and intimately than was ever dreamt of before. This bringing together of the East and the West is a most hopeful sign, one which augurs well for the future of humanity. East and West can never remain isolated either in thought or in life. Each has a profound influence on the other, and thus the unity of the modern world emerges—a unity which demands a new cultural basis. The real issue under these circumstances is, as Dr. Radhakrishnan says, whether we are to be guided by the economic and the pragmatical mind, which is the one more dominant at the moment, or by the spiritual. I am sure that everyone feels that in this so-called machine age there is need for a spiritual outlook. In the work of remoulding human society the role of religion is no less important than that of science.

Although we say that the East is spiritual and the West intellectual, it does not mean either that the West is completely devoid of spirituality, or that the East is devoid of science and intellectual pursuits. The difference is one of degree only and not of quality. In the East, in the pursuit of religion the passive virtues are emphasized, like meditation and self-control, while in the West vigorous and active life appeals to the people. As a physiologist, I might ascribe this difference in the behaviour of the people living in Asia and in Europe to environmental differences, such as differences in climate. But that explanation would be only partially correct.

I consider 'action' here in its widest sense, and it includes scientific pursuits as opposed to speculative philosophy.

Familiarity with, and an understanding of, the physical world produce the scientist. Science calls also for skill of hand, ear and eye, and the knowledge of tools and their effective use. A scientist is essentially a man of action. Full co-operation of brain and hand is necessary, and this results only from a lifetime of practice in co-ordination. In India, certain attitudes have prevailed, which have interfered with 'action' and the consequent mastery of nature. Manual work is generally held in contempt, as the Prime Minister says. Until about the seventeenth century, the conditions in Europe were very much the same as in India. The sudden development of the control of nature which has taken place in Europe and America has not resulted from any sudden increase in the mental ability of men, but has followed liberation from certain kinds of bondage of mind and spirit which kept men largely helpless.

There is a difference between a scientist and a speculative philosopher. It is characteristic of the latter that his attention is directed not to the objective world about him, but inwardly upon his own thoughts and mental processes. The scientist, on the other hand, has developed skill of hand, eye and ear, and his attention is directed to the objective world around him. As the philosopher's influence spreads, the attitude tends to prevail in society that the work of speculation on patterns and theories beyond the test of objective experience is important, while the physical world is relatively unimportant. When men come to give first allegiance to a world of speculation, which is beyond objective examination, the increasing mastery of the objective world, the progressive remaking of man's environment to suit his needs, slows down to a stop. Whenever speculative philosophy in its flight from objective reality becomes dominant, man's mastery of his objective world declines.

Such a decline in the habit of mastering nature and controlling environment has taken place in India.

And yet, this is not in conformity with the teachings of our great religious teachers. In this connection may I refer you to the *Bhagavad-Gita*, which grows in stature as the years pass? More than ever we appreciate its profound wisdom and sagacity, its humanity and sobriety, its compassion and discernment, all expressed with such masterly clarity of language and concentration on the essential. The wisdom it contains is revealed in new and unsuspected ways and harmonies, and acts as a guide to us for meeting and grappling with new situation as they arise with the passage of time. In the precarious circumstances in which mankind is placed today, we may profitably look to this ancient message for adequate means of safety and salvation. To my mind, the *Bhagavad-Gita* meets the present situation in the world in a beautiful manner.

I need hardly tell you of the circumstances in which the dialogue between Arjuna and Krishna which is recorded in the *Bhagavad-Gita*, took place. You are fully aware of them. When the battle is all set and about to begin, Arjuna is seized with some doubts and difficulties. In a moment of despair he throws down his arms and refuses to fight. The whole dialogue is meant to bring about in him a change of mind, and in the end Arjuna is ready to fight. The question is raised whether action or its renunciation is better, and the conclusion is that action is better. So the *Bhagavad-Gita* contains a philosophy of action which has a universal appeal. Throughout, Bhagavan Krishna emphasizes the need for action. The *Bhagavad-Gita* explains what a man ought to do, not merely as a social being, but also as an individual with a spiritual destiny :—

> . . . . No man shall 'scape from act
> By shunning action; nay, and none shall come
> By mere renouncements unto perfectness.
>
> . . . . He who sits
> Suppressing all the instruments of flesh,
> Yet in his idle heart thinking on them,

Plays the inept and guilty hypocrite:
But he who, with strong body serving mind,
Gives up his mortal powers to worthy work,
Not seeking gain, Arjuna, such an one
Is honourable. Do thine allotted task !
Work is more excellent than idleness;
The body's life proceeds not, lacking work.
. . . Therefore, thy task prescribed
With spirit unattached gladly perform,
Since in performance of plain duty man
Mounts to his highest bliss.
(*The Song Celestial*)

This is the essence of the *Gita's* teaching. We must work and perform our duty with a detached spirit and not seek any gain from it.

. . . . Let right deeds be
Thy motive, not the fruit which comes from them.
And live in action ! Labour ! Make thine acts
Thy piety, casting all self aside,
Contemning gain and merit; equable
In good or evil: equability
Is Yog, is piety!
(Ibid.)

And finally, in the last chapter (Chapter XVIII) Bhagavan Krishna says:

Better thine own work is, though done with fault,
Than doing others' work, ev'n excellently.
He shall not fall in sin who fronts the task
Set him by Nature's hand ! Let no man leave
His natural duty, Prince ! though it bear blame!
For every work hath blame, as every flame
Is wrapped in smoke! Only that man attains
Perfect surcease of work whose work was wrought
With mind unfettered, soul wholly subdued
Desires for ever dead, results renounced.
(Ibid.)

The *Gita* also teaches that we should acquire the virtues of humility, harmlessness, truthfulness, purity, constancy, patience, self-control, self-sacrifice, detachment and tranquillity, and conquer fear, anger and passion.

Here we have a code of ethics for our guidance in all our actions—ethics which are capable of universal application.

I may say that the teachings of Hinduism and Islam are the same in this respect. Mr. Manu Subedar, in his Introduction to the *Gita* as explained by Dnyaneshwar Maharaja, quotes Makhdum-ul-Mulk Sheikh Sharfudin Maneri, son of Sheikh Yahya, who died in Bihar six hundred years ago. His teachings are the same as those of the *Bhagavad-Gita*. The ethical principles, in fact, of all great religions are very much the same. What is needed is that all of us in our daily life and conduct should follow these teachings scrupulously. In India, especially at the present time, there is need to realize that our scriptures advise us to work and act in a conscientious and diligent manner, keeping in view the spiritual side of life. Emphasis has to be on action combined with ethics rather than merely on speculation, as mentioned by our Prime Minister at Nizamabad, and this should be suitably incorporated in our education from childhood onwards.

In India today there is an increasing demand for every kind of education: scientific, literary, technical and professional. We also need to train people for leadership in politics, administration, medicine, engineering and other professions, industry and commerce. By the application of scientific and technical knowledge we hope to free this India of ours from poverty, disease and ignorance. India fortunately is rich in natural resources, and all that is needed is to have trained personnel and equipment to exploit these resources to the fullest extent for the good of the people. We have to turn to men of science in our hour of need.

There seems to be an idea that, as our past was perfect, greatness is not to be attained in the present age, that everything was worked out by our ancestors and all that we need do is to imitate them. But, if our cultural life is to retain its dynamic character, it must strive to realize new dreams and adapt itself to new and changing conditions. All that man has yet done is very little compared to what he is destined to achieve.

The present, which moves backwards and forwards, which is a summary of the past and a prophecy of the future, is hallowed ground, and we who tread on it should face it with the quality of reverence and the spirit of adventure.

A life of persistent effort is not possible unless we believe that life has a purpose and a meaning. There appears to be a general feeling nowadays that life has no special aim, that human beings are conditioned almost wholly by their physical make-up. This is responsible for the decline in standards, for the disregard for ideals and for the general sense of despair and frustration.

In the democratic republic in which we live we must believe in the inherent worth of the individual, in the dignity and value of human life. Life has three components: natural, social and spiritual. The study of nature comprises the natural sciences. They give us knowledge of the physical world and the mode of study of these is essentially that of action, in which we use our eyes, ears, hands, sense of touch, etc. It is obvious that we should have a knowledge of the physical world in which we live.

The social aspect of life comprises the study of history, economics, politics, social psychology, anthropology. A knowledge of our social environment and of human institutions is equally essential.

As regards the spiritual aspect, a knowledge of the Humanities is essential. It enables us to understand the wider aspirations and ideals of the human race. It comprises a study of religion, language and literature, music, the fine arts and philosophy. They deal with conduct and the aims of life, and make us acquainted with the wisdom of the ages. This study should not be neglected at any cost. Most of the trouble at the present day is due to want of knowledge of moral and spiritual values.

The natural sciences, social studies and the Humanities are not exclusive of each other; they all have to be brought together and integrated. Science is one of the greatest creations of the human mind. Its aim is the pursuit of Truth, and its method consists of observation and experiment, 'rigid conscientiousness in inference, and elimination of personal prejudice and passion'. Its ideal is the same as that of philosophy, namely the *vision of reality*. Apart from observation and experiment, imaginative insight is also needed in the pursuit of science.

Our education would, however, be incomplete if science were not suitably integrated with social studies and the Humanities. This is part of our general education. At a later stage one may specialize in one or the other, but at no stage does one completely exclude the others. We are passing through an age when science is pre-eminent. Every day there are new scientific discoveries and new applications of those discoveries which have profoundly altered our physical environment. We have, however, not properly adjusted ourselves to these changes; we lack the ability to manage and direct the social forces that shape our lives. Apart from science, therefore, we must learn ethical values and develop a true and just concept of human relations.

India has developed a common culture and a common civilization after centuries of conflict and struggle. Although people belonging to different States speak different languages and have their own habits, there is a fundamental unity of culture which binds them together. This culture is a mixture of different patterns beautifully interwoven. The spirit of our civilization is comprised in the combined teachings of the Vedas, the *Ramayana* and the *Mahabharata* (which includes the *Bhagavad-Gita*), of the Buddha and Shankara, of Ashoka, of Mohammad and of Jesus Christ. Apart from the influence of ancient Hindu and Buddhist cultures, it would be impossible to think of an India where no Moghuls had ruled, where no Taj Mahal had been built, where no Akbar had guided its destinies, and where no English had come, bringing the culture of the West so close to us here.

There are two impulses noticeable at the present time. One is that which, as just mentioned, worships the past and considers that Indian tradition is quite distinct from the Western, and that there is nothing for us to learn from the West. The other is equally dogmatic and wishes to adopt utterly Western methods and modes of thought. To my mind, the right attitude is to adopt all that is best in the West, and to combine it with all that is best in our own past tradition and culture.

The ideals of Indian culture are recognized to be living truths, capable of satisfying the spiritual needs of humanity. Belief and conduct, rites and ceremonies, authorities and dogmas are subordinate to self-realization and contact with the divine spirit. 'Human life is a rhythm with moments of contemplation and of action, of refreshment and restoration in the life of spirit, and *of action with a spirit of mission in the world.*'

Cultures are alive only when they are creative, and respond to some new challenge, physical, social or spiritual. When they rest on their oars they stagnate. When we idolize our past and lose the spirit of adventure, then decadence begins. In the world today we have to build up a community of prosperous and friendly human beings. In this, India can play an important part.

Sylvain Levi refers to the greatness of Indian culture in these words:

> From Persia to the Chinese Sea, from the icy regions of Siberia to the islands of Java and Borneo, from Oceania to Sumatra, India has propagated her beliefs, her tales and her civilizations. She has left indelible imprints on one-fourth of the human race in the course of a long succession of centuries. She has the right to reclaim in Universal history the rank that ignorance has refused her for a long time and to hold her place amongst the great nations summarizing and symbolizing the spirit of humanity.

Science and technology are acting as the solvents of cultures, and nations cannot remain isolated. In making men international-minded, science is playing an important part. But sheer disaster will result, if we cherish science and technology only and starve the spirit. It is with the combination of science with spiritual values that real progress can take place.

My friends, this is just a feeble attempt on my part to jot down briefly some of my thoughts and feelings which arise as I consider the present crisis in world affairs. Luckily I am not the only one who believes that the situation requires some radical solution. At the present moment in India we are fortunate in having two philosopher-statesmen, who by their speeches, writings and personal contacts are making an important contribution in this field. There is our Prime Minister, Shri Jawaharlal Nehru, who, with a background of science, is a symbol of modern India, combining in himself the cultures of both the East and the West. Then there is Dr. Radhakrishnan, the Vice-President of India, who, with a background of philosophy and religion, is a happy and rare combination of ancient wisdom with its Humanities and the modern scientific outlook. Both these great leaders are exercising a profound influence in the world today and are not only promoting world peace, but also helping to create a new world culture, which will be a happy synthesis of the East and the West.

In conclusion, may I say that the true philosophy of action consists in working, but working in such a spirit that work is its own reward? The work should be invested with dignity and it should be for a noble purpose. In the term 'action' I include all scientific endeavour. Science gives to men habits of mental accuracy, modes of thought which enlarge the mental horizon. But we had expected much more from science. Philosophers from Plato to Comte have sought for law, for order in the affairs of mankind. Can this be achieved through science alone? I think not.

In the nineteenth century people thought that in science they had discovered a panacea for all the ills with which humanity is afflicted. May I remind you of the following lines of Shelley?

> . . . . happiness
> And science dawn though late upon the earth;
> Peace cheers the mind, health renovates the frame;
> Disease and pleasure cease to mingle here,
> Reason and passion cease to combat there;
> Whilst mind unfettered o'er the earth extends
> Its all-subduing energies, and wields
> The sceptre of a vast dominion there.

Although science has great achievements to its credit and it should certainly be actively pursued, especially in India, the earlier hopes have not been altogether fulfilled. Science is concerned with reason. But human beings are not always swayed by reason; they are swayed much more by emotion and passion. Emotions and passions cannot be controlled by science, but by a thorough understanding and practice of ethical principles and spiritual values. There is much truth in what Marion Crawford wrote:

> Look where you will throughout the length and breadth of all that was the world, 5,000 or 500 years ago, everywhere passion has swept thought before it, and belief reason. Passion rules the world, and rules alone. And passion is neither of the head nor of the hand, but of the heart. Love, hate, ambition, anger, avarice, either make a slave of intelligence to serve their impulses, or break down its impotent opposition with the unanswerable argument of brute force, and tear it to pieces with iron hands.

In our actions, Jesus Christ enjoins us to seek first the Kingdom of God and His righteousness. He says in the Sermon on the Mount:

> Therefore I say unto you, Take no thought for your life, what ye shall eat, or what ye shall drink; nor yet for your body, what ye shall put on. Is not the life more than meat, and the body than raiment?

And again:

> But seek ye first the Kingdom of God and His righteousness; and all these things shall be added unto you.

It is in the continual remembrance of a glorious past that individuals and nations find their noblest inspiration. In order to meet successfully the challenge of our times let us imbibe all that is best and noblest in the modern age of science, and also seek inspiration from the humanity and wisdom of our ancient Sages and Teachers. It is only by a synthesis of such a nature, that we can lay the foundation of true progress. Actions are to be performed without selfish attachment or expectation of rewards. Renunciation of any duty, which is to be done, is not right. It is good to perform the duty which is prescribed, for duty's sake and not for any fruits that may be derived from it.

Even God Himself is ever at work, silent and slumberless, lest the worlds should come to an end. Thus says Bhagavan Krishna:

> . . . . Look on me,
> Thou son of Pritha! in the three wide worlds
> I am not bound to any toil, no height
> Awaits to scale, no gift remains to gain,
> Yet I act here! and, if I acted not—
> Earnest and watchful — those that look to me
> For guidance, sinking back to sloth again
> Because I slumbered, would decline from good,
> And I should break earth's order and commit
> Her offspring unto ruin, Bharata.
>
> (*The Song Celestial*)

What greater testimony do we need as to the need of action and its true philosophy?

CHAPTER V

SCIENCE AND WORLD PEACE*

THE Second World War is less than twelve years behind us, but every now and again the world grows restless and peace is ever being threatened, now in Egypt, now in Indonesia, now in Jordan, while fear of the demonstrated devastation wrought by atomic weapons overshadows in many minds the potential beneficence of radioactivity applied to constructive ends. Happily India's influence, through her Prime Minister, has been consistently exerted on the side of peace, but we are all still in search of a suitable remedy for the existing unhappy state of affairs and some progress has been made in this direction. The urge for peace is strongest when men are at war, as during the two World Wars. But when hostilities cease, the urge becomes gradually less pronounced with the passage of time.

Let us consider briefly, at the outset, the history of the movements for maintaining World Peace in recent years.

The League of Nations arose out of the agony of World War I (1914-18). At the very outbreak of the war, Sir Edward Grey voiced the belief that the only way out was the formation of a League of Nations. Mr. Asquith as Prime Minister repeated this again and again. It was taken up by the Americans and the neutrals. President Wilson became the mouthpiece of this movement, so much so that a League was put in the forefront of the Allies' War aims.

The League, which was established in 1919, was an attempt to build on the tendencies which prevailed, to organize peace and to give formal expression to the interdependence of modern nations. Some steps had been taken before the First World War to have some machinery for the peaceful settlement of disputes, such as the Concert of Europe, the Hague Conferences and the Permanent Court of Arbitration, etc.

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*An address delivered at the World Peace Day Meeting of the Indian Institute of World Culture, Bangalore, on 6th August 1956.

In essence, the League of Nations was an Association of States that had signed a Treaty, the Covenant pledging them to settle disputes peacefully and to co-operate in matters of international concern.

I need not go into its history any further. Suffice it to say, that the League tried to do useful work during the time it lasted. About twenty years after the League was formed, another World War broke out in 1939; a war of a greater magnitude than the First, from the consequences of which we have not yet fully recovered.

One of the bodies set up by the League of Nations was its Health Section, which, I am glad to say, was more successful in its achievements than the League itself, and is justifiably regarded as the precursor of the World Health Organization, which exists today as an organ of the United Nations.

The United Nations came into being during the Second World War. On the 14th of August 1941, President Roosevelt and Prime Minister Churchill issued a joint statement known as the Atlantic Charter, which envisaged a peace affording to all peoples security from aggression, freedom to choose their own government, access to the trade and raw materials of the world, freedom of the seas, improved labour standards, economic advancement and social security, and freedom from fear and want. This was followed by the Declaration by the United Nations on the 1st of January 1942, the Moscow Declaration on the 30th of October 1943, the Dumbarton Oaks Proposals (Washington D.C.) in the summer and fall of 1944, the Crimea Conference held at Yalta in February 1945, and the San Francisco Conference, which was held from the 25th of April to the 26th of June 1945. It was at this last Conference that the Charter was unanimously approved and signed by all the participating governments. It was also there that a preparatory commission was established, which drew up detailed plans for the functioning of the principal organs of the United Nations. Subsequently, the General Assembly met for the first time in London on the 10th of January 1946, so that it is now about eleven and a half years that this organization has been functioning.

The United Nations Organization has four purposes:

1. To maintain international peace and security.
2. To develop friendly relations among nations, based on respect for the equal rights and self-determination of peoples.
3. To co-operate in solving international problems of an economic, social, cultural or humanitarian character and in promoting respect for human rights and fundamental freedom for all.
4. To be a centre for harmonizing the actions of nations in attaining these common ends.

The Charter of the United Nations was framed because the people of the United Nations were determined:

1. To save succeeding nations from the scourge of war.
2. To reaffirm faith in basic human rights and in the equal rights of men and women of all nations.
3. To establish conditions under which justice and respect for treaty obligations could be maintained.
4. To promote better standards of living and for these ends to practise tolerance and live in peace with one another; to unite their strength to ensure that armed force is used only in the common interest; and to employ international machinery for promoting the economic and social advancement of all peoples.

The United Nations Organization has a number of Specialized Agencies. I shall refer only to two of them, namely: (*a*) The United Nations Educational, Scientific and Cultural Organization (UNESCO), (*b*) The World Health Organization (WHO).

The aims of the United Nations Educational, Scientific and Cultural Organization are two: (*a*) It is international and has to serve the ends and objects of the United Nations.

(*b*) It must foster and promote all aspects of education, science and culture.

It is laid down in the Preamble to its Constitution that 'since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed.' Ignorance of one another's ways and lives has been throughout the history of mankind a common cause of the suspicion and mistrust among the peoples of the world through which their differences have all too often broken out in war. The wide diffusion of culture and the education of humanity for justice, liberty and peace are indispensable to the dignity of man and constitute a sacred duty, which all nations must fulfil in a spirit of mutual assistance and concern.

A peace based exclusively upon the political and economic arrangements of governments would be inadequate, since it could not secure the unanimous lasting and sincere support of the peoples of the world. *Peace must therefore be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind.* Thus UNESCO was created for the purpose of advancing, through the educational and scientific and cultural relations of the peoples of the world, the objectives of international peace and of the common welfare of mankind, for which the United Nations Organization was established.

UNESCO has a wide programme of work, which includes reconstruction, communications, education, cultural interchange, human and social relations and natural science, and it has a good record of work to its credit.

'The attainment by all peoples of the highest possible level of health' is the purpose for which the World Health Organization was created as a part of the U.N.O. Some of the functions of W.H.O. are:

(a) To act as the co-ordinating authority on international health work.

(b) To stimulate and advance work to eradicate epidemic, endemic and other diseases.

(c) To promote the improvement of nutrition, housing, sanitation, recreation, economic or working conditions and other aspects of environmental hygiene.

(d) To promote maternal and child health and welfare.

(e) To promote research in the field of health.

By promoting all measures for the improvement of health, W.H.O., as well as the United Nations International Children's Emergency Fund (U.N.I.C.E.F.), is making a great contribution to World Peace. There is world-wide co-operation in this field; more so here than in any other activity of the U.N.O. This is indeed very gratifying!

To abolish war altogether is not impossible. This is all the more important, as war today is a greater menace than it was in the past. It is likely to be a still greater menace in the future. According to Bertrand Russell, there are three sorts of obstacles to its abolition, namely: political, economic and psychological. These obstacles cannot be removed quickly. There is need for a single supreme world-government, which will impose its will on any national state or combination of states. Economic conditions include economic and social justice among nations as among individuals. To get over certain psychological obstacles and remove all racial hatred and prejudices, it is necessary to introduce a fresh humanistic spirit in education. Special stress is needed on the training of character. Bias and credulity are characteristics which are very useful to the war-monger. It will be necessary in their place to develop a spirit of impartiality and a measure of scepticism. A scientific habit of mind should be cultivated and a judicial power of weighing evidence. If peace is to be preserved, mankind must learn not to be divided into hostile camps by opposing irrational fanaticisms. History has become the handmaid of partriotism, patriotism often of the most aggressive type. To correct this, the sense of justice must be cultivated from the nursery onwards.

We must all make a determined attempt to maintain permanent peace in the world.

Organized and cumulative knowledge based on observation and experiment, which we call 'Science', is the one great feature of modern times. Although still in its infancy, it has revolutionized man's way of life and his attitude to the universe. Moreover, the rate of change is increasing and the next fifty years will probably see changes far outstripping even what has been done during the last two hundred years. The main effect of the application of science has been to shrink the globe to a fraction of its former girth by the invention of the radio, the telegraph, the telephone, the railway, the steamship, the aeroplane, and cheap printing. Another effect is that mankind is culturally and economically becoming one interdependent society, in which injuries done to one member have repercussions which are felt more or less severely by all the rest. The material basis of our civilization has been growing and altering more quickly than the habits or beliefs of long standing, so that the latter have not adapted themselves properly to the changing conditions. The growth of science has also led to great industrial development. Further, I cannot emphasize too strongly that scientific research is primarily meant to discover the truth by objective methods.

All scientific knowledge should be employed for the good and welfare of humanity and not for its destruction. The use of atomic and hydrogen bombs, poison gas and disease germs in warfare is ethically wrong and should be forbidden. India is raising her voice in this matter with promising results.

On the 5th of August, 1956, it was announced in the press by Dr. H. J. Bhabha, Chairman of the Atomic Energy Commission, that India had started producing atomic energy, and that the first atomic reactor, which was also the first in Asia, had gone into operation on the afternoon of the 4th of August 1956 at Trombay. This is indeed a matter on which Dr. Bhabha and his enthusiastic band of workers deserve our hearty congratulations. The atomic energy produced here will ultimately be used for making radioactive isotopes for research in agriculture, industry and medicine. It will be used for peaceful purposes and not for war, and thus India, I am glad to say, has set a very fine example to the rest of the world in this respect.

Scientists are interested primarily, as I have just said, in the discovery of truth. The responsibility for applying scientific discoveries for war purposes does not rest with the scientists alone. It was the scientists, not the non-scientific men, who protested against the use of the atom bomb on Hiroshima and Nagasaki. It is the scientists who, by virtue of their technical knowledge, know the harmful effects of their discoveries. *I feel that they should not rest content merely with the discovery of truth. They can and should play an important part in deciding how their discoveries should be incorporated in the social life of the people.* In the final analysis, it is the moral force which will control the harmful application of these discoveries.

There are today hopeful signs. The agitation against the testing of atomic and hydrogen bombs has been growing in intensity and extent. And the report came in the first part of last April from West Germany that fifteen leading atomic scientists, among them the Nobel Laureate Werner Carl Heisenberg, had signed a declaration issued by the Max Planck Institute, of which they were members, to the effect that a small country like theirs could at present best protect itself and serve world peace by renouncing the possession of all kinds of atomic weapons. They were quoted as stating that, while they were not politicians they felt responsible for the possible consequences of their scientific work and that they were not prepared to take part in any way in the production, testing or operation of atomic weapons. Some East German scientists were shortly afterward reported to have endorsed their stand. These reports are very encouraging and one must hope that the example set will spread.

According to H. G. Wells, there are three episodes in human history which are the most important in the development of the human race and its civilization, namely:

1. The awakening of free thought in mankind by the Ionian Greeks.
2. The awakening of the free conscience of mankind by the Hebrew prophets.
3. The awakening of the sense of solidarity in mankind by the political and social changes of recent times.

To these he adds a fourth as a co-efficient, as an essential condition for future progress, namely, the need for the self-discipline of each and every individual and nation in the feeling of social obligation and for good manners, so that the above three forces may operate for the greatest good of the greatest number. I believe that in bringing about this self-discipline of individuals and nations, modern medicine has played a great part as a tremendous social force by minimizing the enormous havoc wrought by disease and by improving the health and consequently the social and economic conditions of the people. This gives us faith in our profession and should make us look to the future with courage and confidence.

As a medical man may I say, that Medicine is a wholesome blend of Science and the Humanities and in that respect differs from pure science? We in the medical profession have been guided in our conduct and practice by certain universal ethical principles, which have been handed down to us from the past. Those ethical principles should also guide all scientists. The Oath of Hippocrates has been known to all medical men and women all the world over for centuries. The author of this Oath, Hippocrates, was a Greek physician who was born in the little island of Cos off the Coast of Asia Minor in 460 B.C. He died probably in 355B.C. His Oath contains a noble code of ethics, in which the student is shown the dignity and responsibility of his calling; and there are urged upon him the duties of respect for his teacher and his school, of seeking above all the benefit of his patient and of taking no mean advantage of his position as medical adviser.

Speaking at the Indian Institute of World Culture, Bangalore, on World Peace Day last year, I ventured to suggest a modification of the Hippocratic Oath for scientists, trusting that it would guide them to divert their efforts to such pursuits as are beneficial to the human race. For what is the use of science, if it destroys mankind?

I suggest for the scientist the following Oath:

I swear by all that is Holy and Sacred, that according to my ability and judgment, I will keep this Oath and this stipulation; to reckon him who taught me this science equally dear to me as my parents, to share my substance with him and relieve his necessities if required; to look upon his offspring as equal to my own brothers, and to teach them this Science if they shall wish to learn it, and that by precept, lecture and every mode of instruction I will impart a knowledge of this science to my own sons and those of my teachers and to disciples bound by a stipulation and an Oath to obedience to this Law of Science, but to none other. I will follow that system of regimen, which according to my ability and judgment I consider to be for the benefit of humanity and abstain from whatever is injurious and harmful. I will always seek the truth and will try to grow in knowledge. I will devote myself to my science even at the risk of my life. With purity and with holiness I will pass my life and practise my scientific knowledge in a manner that will be for the good of all mankind, believing that where there is a love of man there is also love of this knowledge. While I continue to keep this Oath unviolated, may it be granted to me to enjoy life and learn and practise this Science for all time. But should I trespass and violate this Oath, may the reverse be my lot.

And now may I repeat the statement made in July 1955 jointly by Albert Einstein, Percy W. Bridgman, Leopold Infeld, Hermann J. Muller, Cecil F. Powell, Joseph Rotblat, Bertrand Russell, Hideki Yukawa and Jean Frederic Joliot-Curie, all world-renowned scientists and humanists, who had clearly stated the problem facing humanity today?

Here then is the problem which we present to you, stark and dreadful and inescapable: shall we put an end to the human race or shall mankind renounce war? People will not face this alternative, because it is so difficult to abolish war.

There lies before us, if we choose, continual progress in happiness, knowledge and wisdom. Shall we instead choose death because we cannot forget our quarrels? We appeal, as human beings, to human beings; remember your humanity, and forget the rest. If you can do so, the way lies open to a new paradise; if you cannot, there lies before you the risk of universal death.

It is high time that something was done about this matter. The real answer is education, especially university education. The university is the chief agency in mobilizing the cultural resources of the nation for the paramount purpose of national expansion and progress as well as the promotion of World Peace. In university education, it is essential to lay stress on internationalism. The new note to be struck is that of international amity and concord. The marvellous creation of Rabindranath Tagore's brain, Visvabharati at Shanti Niketan, at once Indian and universal as its name shows, has placed India in the forefront in this movement of international universities.

The apostles of amity and concord are the youth of today, in whose hands the future of this world rests. They are the custodians of World Peace. If only they knew how great are their potential power and responsibility in this sphere! The greatest asset of youth is its optimism, its perennial spring of joy and spirit of adventure. It is the youth, with their fresh outlook on the affairs of the world, who can find a satisfactory solution, where the former custodians of the world have so far failed. I, therefore, make a special appeal to the youth of my country, that they should be inspired by a wide outlook, so that they may cherish profound love not only for their own Motherland but for all mankind and ignore all differences of race, language, creed or colour.

In conclusion, I should like to emphasize that to bring about World Peace our outlook must be based on some form of humanism. A new tradition of humanism has to be created, a new interpretation of history, which will heal all schisms and discords and dispose us to national harmony and international amity. It must be scientific humanism, as the application of science provides most of the material basis for human culture; and also the practice of science needs to be integrated with the humanities. *The outlook must not be merely materialistic, but must embrace the spiritual as well as the material aspects of existence.* Scientific humanism would help us to make an evolutionary approach to the affairs of mankind, not merely a static approach. This is essential, as it would be a link between the natural sciences and human history and would provide a satisfactory explanation for the various trends and activities with all their diversities, which we call progress. And above all, we should have faith in the teachings of the great masters of the past. We should remember the words of the Buddha: 'Victory breeds hatred, for the vanquished is stricken with suffering.'

Therefore it is that one war leads to another, for the vanquished in one war, who is stricken with suffering, seeks to avenge it in the next war, and the process is repeated *ad infinitum*. The pain and misery caused are equally severe in the case of both the opposing parties.

We cannot be national without being international.

Let us dedicate ourselves to the cause of World Peace, with hearts full of universal love, believing firmly that

Serene will be our days and bright,
And happy will our nature be,
When love is an unerring light,
And joy its own security.

Chapter VI

MEDICINE AND ETHICS*

With the development of corporate life among human beings the observance of ethics in their daily life and conduct became necessary, and the need for this steadily grew. Such community life began with the organisation of the family, which first developed into a larger family group (the joint-family), then into a community or a tribe, then a nation and finally, as we observe today, it seeks to include the entire human race in its purview, irrespective of any racial or geographical boundaries. As a consequence of this there is gradually a restriction of the individual's liberty of action in the interest of the larger and larger groups, to which he belongs. This happened specially in the case of those, who were engaged in the practice of Medicine. The medicine man, as the physician was originally called, was the first category of professional man in the evolution of society. A physician while looking after a sick person comes in more intimate contact with his fellow-beings than a member of any other profession, and this throws greater responsibilities on his shoulders. Thus it came about that the early physicians imposed important restrictions on themselves, which were largely in the interest of those whose sufferings and pain they were called upon to alleviate.

At the outset, may I say that in order to understand the true significance of medical ethics, a study of the history of Medicine is essential. It would help us to absorb from its ancient records a high standard of medical ethics. It would help us to respect the antiquity, the sanctity, and the dignity of our calling. It will inspire us with the love of our profession. It will impress upon us the noble traditions, which have been handed down to us from the past. It will infuse in us a sense of humility, so that we do not over-estimate the value of our present work. In brief, it will enable us to realise, in the words of Andrew Lang, that 'the little present

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must not be allowed wholely to elbow the great past out of view'. The study of the history of medicine has not received the attention it deserves in India, and I would very much like to see that it is pursued with increasing vigour and interest in our Universities and Medical Colleges.

In discussing today the subject of Medicine and Ethics in its historical background, I shall confine myself mainly to the old Ayurvedic Medicine in India and Greek Medicine.

AYURVEDIC MEDICINE

The history of Ayurveda goes back to about 3,000 B.C. and its early part is shrouded in mystery. The ancient Hindus believed that the knowledge of Medicine was a gift of God. Medicine in India had reached a very high stage of development in the old days. Its influence was not confined to India alone, but spread also to other countries in Asia as well, as Persia, Ceylon and countries in South East Asia, as well as Egypt and Greece. Charak and Sushruta are considered the highest authorities in Ayurveda and their writings *Charak Samhitá* and *Sushruta Samhita*, are still read with profound respect and esteem. I shall restrict myself here to the ethical principles propounded by them.

To begin with, in admitting students to the study of Medicine as much importance was attached to the moral fitness as to the intellectual and physical fitness of the pupils, for it was considered axiomatic in those days that moral excellence was the basis of all true education, including medical education. The object of education was not merely to prepare the student to earn a livelihood, but also to infuse in him a strong desire to lead a good and virtuous life. Further, there was a very intimate contact between the teacher and the student, so much so, that during the period of education the teacher was actually regarded as a father. The students were carefully selected for admission. It was laid down, that before a student was admitted, he had to undergo a period of probation for six months to one year. If after this, the teacher was satisfied as to the character and intellectual capability of the student, he was allowed to proceed further and continue his studies. Says, Vaghbhata in *Astanga Sangraha*:

> A disciple who is capable and possessed of modesty, purity and arts, and who has served a probationary period of six months, should be taught as long as he gains perfection in the the theory and practice of the Science.

Preference to enter the medical profession was given to the members of families with long medical traditions. It was believed that they would have a better aptitude for medical learning and practice than those from non-medical families.

Initiation Ceremony

A special initiation ceremony was held when the student commenced his medical studies. I shall describe in some detail the Oath of initiation as given in (i) *Charak Samhita*, (ii) *Sushruta Samhita*,, (iii) *Kasyapa Samhita* and (iv) *Hastyayurveda*.

I. *Charak Samhita*

The teacher instructed the disciple in the presence of the sacred fire, Brahmans and physicians, saying:

'Thou shalt lead the life of a celebate (*Brahmahari*), grow thy hair and beard, speak only the truth, eat not meat, eat only pure articles of food, be free from envy, and carry no arms.

Thou shalt dedicate thyself to me and regard me as thy chief. Thou shalt be subject to me and conduct thyself for ever for my welfare and pleasure. Thou shalt serve and dwell with me like a son. . . . . Thou shalt behave and act without arrogance and with care and attention, and with undistracted mind, humility, constant reflection, and with ungrudging obedience. Acting either at my behest or otherwise, thou shalt exert thyself for achievement of thy teacher's purpose alone, to the best of thy abilities.

If thou desirest success, wealth and fame as a physician, and heaven after death, thou shalt pray for the welfare of all creatures.

Day and night, however, thou mayest be engaged, thou shalt endeavour for the relief of the patients with all thy heart and soul. Thou shalt not desert or injure thy patient even for the sake of thy life or thy living. Thou shalt not commit adultery even in thought. Even so, thou shalt not covet others' possessions. Thou shalt be modest in thy attire and appearance. Thou shouldst not be a drunkard or a sinful man nor shouldst thou associate with the abettors of crimes. Thou shouldst speak words that are gentle, pure and righteous, pleasing, worthy, true, wholesome and moderate. Thy behaviour must be in consideration with time and place and heedful of past experience. Thou shalt act always with a view to the acquisition of knowledge and the fullness of equipment.

No offering of gifts by a woman without the behest of her husband or guardian shall be accepted by thee. While entering the patient's house, thou shalt be accompanied by a man, who is known to the patient and who has his permission to enter, and thou shalt be well clad and bent of head, self possessed and conduct thyself after repeated consideration. Thou shalt thus properly make thy entry. Having entered, thy speech, mind, intellect and senses shall be entirely devoted to no other thought, than that of being helpful to the patient and of things concerning him only.

The peculiar customs of the patient's household shall not be made public. Even knowing that the patient's span of life has come to its close, it shall not be mentioned by thee there, where if mentioned, it would cause shock to the patient, or to others.

Though possessed of knowledge, one should not boast very much of one's knowledge. Most people are offended by the boastfulness of even those who are otherwise good and authoritative.'

II. *Sushrutha Samhita*

The teacher addresses the pupil thus:

'Thou shalt renounce all evil desires, anger, greed, passion, egotism, envy, harshness, meanness, untruth, indolence and other qualities that bring infamy upon oneself. Thou shalt clip thy nails and hair close, observe cleanliness, wear brown garments and dedicate thyself to the observance of the truth, celibacy and reverence to the elders. Devoting thyself at my bidding to movement, laying thyself down, being seated, taking thy meal and study, thou shalt be engaged in doing whatever is good and pleasing to me. If thou shouldst behave otherwise, sin will befall thee. Thy learning will go fruitless and will attain no esteem.

If I do not treat thee properly despite thy proper observance of these behests, may sin befall me and my learning will go fruitless.

The twice-born, the preceptor, the poor, the friendly, the travellers, the lowly, the good and the destitute — these thou shalt treat, when thy come to thee, like thy own kith and kin and relieve their ailments with thy medications. Thus behaving good will befall thee. . . .

Thus, thy learning will attain esteem and will gain for thee friends, fame, righteousness, wealth and fulfilments.'

III. *Kasyapa Samhita*

The teacher addresses the pupil thus:

'O gentle one, you should be agreeable in disposition and righteous. You should control your senses and be ready to study when called. You shall have no secrets from me, share the suffering of others, bear in mind country and clime and be resolute. You should be away from greed, anger, infatuation, envy, derision, enmity, wine, flesh and females. You should apply yourself to study after serving the preceptor. You should not go away without taking his permission, without having worshipped the preceptor and without completing the full course of study.'

IV. *Hastyayurveda*

The teacher addresses the pupil thus:

'O son you should never turn deceitful, wicked, greedy, envious, hard-hearted and unfair. You should always be free from lethargy and sin and you should have the character of venerable persons and compassion for the family and should always put yourself at the service of the preceptor.'

Thus, you see, medical education was pursued with a spirit of dedication, as is evidenced by these Oaths of Initiation. After elaborate ceremonial, the guru or the teacher depicted the duties and responsibilities which fell upon the young student who aspired to join the profession of Medicine. The pupil was informed fully as to how he should behave during his student career and later as a fully qualified physician. All this was done with due dignity and solemnity as an Oath of Initiation, which was administered by the teacher to the student before the sacred fire and in the presence of the Brahmans and well-known physicians; and the student took it after invoking the names of the great pioneers of Ayurveda, e.g. Brahma, Dhanvantari, Prajapati, Aswins *et. al.* The ancient people attached great importance to this ceremony, as it impressed upon the mind of the young student at the commencement of his career the solemnity and sanctity of his duties as a physician.

On the completion of the initiation ceremony the student was designated as a *Brahmachari*, and he retained the title till the end of his student life. During his student life, he was specially instructed to observe celibacy, not to carry weapons, not to indulge in rebellious or immoral acts. According to Kasyapa, he was advised as a *Brahmachari* to keep a liberal and receptive mind and make his contributions to the growth of knowledge and progress in general.

The Convocation or Samavartana Ceremony

At the conclusion of his studies, when the student was about to embark on his medical career a ceremony known as the *Samavartana* ceremony was held. This according to Charak was as follows:

There was at first a repetition of the main substance of the Oath of Initiation already mentioned above. Then the teacher thus addressed the young physician, who had been newly qualified:

'Acting at my behest, thou shalt exert thyself for the achievement of the teacher's purposes alone to the best of thy abilities.

There is no limit at all to the "Science of Life". So thou shouldst apply thyself to it with diligence. This is how thou shouldst act. Again thou shouldst learn the practical skill from another without carping. The entire world is the teacher to the intelligent and the foe to the unintelligent. Hence, know this well, thou shouldst listen and act according to the words of instruction of even an unfriendly person, when they are worthy and such as bring fame to you and long life, and are capable of giving you strength and prosperity.

'The twice born, the preceptor, the poor, the good and the destitute — these thou shalt treat, when they come to thee, like thy own kith and kin and relieve their ailments with thy medications. Thus behaving, good will befall thee. Thus thy learning will attain esteem and will gain for thee friends, fame, righteousness, wealth and fulfilment.'

The young physician was also advised according to the *Charak Samhita* as follows:

'Having finished his studies and permitted to leave the school, he should go about wearing white garments with clipped hair, with undeluded mind and with his eyes looking straight before him. He must be genial and take initiative in a conversation. He must never resort to the patient's house uninvited. Having entered, he must scrutinize the prognostic omens. He should not turn his gaze on anything else in the house but the patient. He should not make his entry into a house without announcing himself. He should not broadcast the secrets or the shortcomings of the patient's household. He should withhold from the patient the untoward prognostic signs that he may have perceived. He should not administer the medicine in the wrong order nor should he delegate the responsibilities to another. He should make an altogether novel combination and administer it. He must be versed in the knowledge of characteristics of constitutions, drugs, disease and age. He should always be equipped with the store of fumigating drugs, eye-salves and other medicines. He should not incur the hostility of other members of his profession. In co-operation with them he should prepare the medications. He should be given to speech that is bold, unambigous, prompt, vivid, charming, gentle, persuasive, comprehensive, non-contradictory and righteous. For indeed, the physician who desires the well-being of people enjoys happiness in this world as well as in the other.'

From the above oaths we learn that the following points were stressed. The graduate could not return to his place without the express permission of the preceptor. He must complete the course of theoretical text and must fully understand the interpretation. He must have witnessed the performance of actual operations himself. He must be neat and clean in appearance. He must put on white clothes, carry an umbrella and stick, and put on shoes. His dress must not be foppish. His mind must be pure and good. His speech should not be violent. He must not practice any deceit. He must have a brotherly feeling towards all creatures. He must possess sufficient assistants and equipments. He is advised as to how he should proceed to the patient's place, what he should do there, how he should examine the patient, what kind of cases he should accept for treatment, what the most difficult cases for cure are and lastly, though not of the least importance is the injunction given to avoid intimate association with women. His relations with other physicians are emphasized and consultations with other physicians in difficult cases are strongly recommended. These oaths formed the basis of the ethics of the physician and a physician having all these qualities could have a successful medical career.

In ancient India, after finishing one's medical education, one had to obtain the permission of the King to start one's professional career. This is what Sushruta says:

> Having studied the Science, having fully grasped the meaning, having acquired practical skill and having performed operations on dummies, with ability to teach the science and with the King's permission a physician should enter into his profession.
>
> *Sushruta Samhita.*

This was done to protect the people from quacks and charlatans.

Sukracharya also states positively that without the permission of the King no physicians should be allowed to practise.

Ayurveda is deeply rooted in the soil of India and a large majority of the people still seek comfort from it. It has contributed largely to our cultural heritage. It is closely linked with old Hindu philosophy and spiritual wisdom.

The teachings of the Buddha had a most salutary influence on the practice of Medicine in the old days, especially on the ethical side. His famous saying, 'Brethren, he who would wait on me, let him wait on the sick', had very far-reaching effects. It was because of this humane teaching that charitable hospitals were established during the regime of Aśoka and other Buddhist kings. Charak, the author of *Charak Samhita*, was the court physician of the Buddhist king Kanishka. Nagarjuna, the Buddhist sage, infused new life into the science of Ayurveda. He was a very versatile character. He was a great chemist and a philosopher of ancient India, who lived in the first century of the Christian era. During his time, there was a well-known university on the the banks of the River Krishna. He resided there. Nagarjuna Kunda, a hill in Guntur District, is named after him. Apart from the Mahayana form of Buddhism, which he propounded, he made many contributions to medicine and chemistry. It was he, who introduced the processes of distillation, sublimation, calcination, colouring and alloying of metals, extraction of copper from pyrites, and invented the necessary apparatus for carrying out these processes. He was the first to use metal oxides and *kajjali* or black oxide of mercury and other prepartions of mercury in Medicine. He advanced our knowledge of chemistry a great deal. He may truly be called the Father of Indian Chemistry. And further in practising medicine, Nagarjuna followed the noble ethical principles of Buddhism, namely to practice the profession in a true spirit of service. I need hardly emphasize that it is in our own past tradition and culture that we find our noblest inspiration.

GREEK MEDICINE

The ancient Greeks took their knowledge of medicine from Egypt, Babylon and India. Like the Hindus, they believed that the knowledge of medicine was the gift of God. The greatest Greek Physician was Hippocrates, who is commonly known as the 'Father of Medicine'. He was born in 460 B.C. at Cos off the Coast of Asia Minor. He taught medicine in the Medical School at Cos and also lectured and practised in Athens and other Greek cities. Hippocrates was a contemporary of Socrates, Plato, Sophocles and Herodotus. It was a brilliant period in the history of Greece. The great achievement of Hippocrates consists in dissociating medicine from theology and magic. His teachings are contained in the *Corpus Hippocraticum* or 'Hippocratic Collection'. He is the author of the famous Hippocratic Oath, with which we are particularly concerned here today.

The ideal of service to the community was deeply ingrained amongst the ancient Greeks. Their aim was to be useful and helpful to other men, to 'make gentle the life of the world'. There is a famous saying of Prodicus (fifth century B.C.): 'That which benefits human life is God.'

In the writings of Hippocrates we find this attitude depicted again and again. This is beautifully expressed in his famous saying: 'Where there is love of humanity, there will be love of the profession (Medical profession).' He had laid down the following qualifications required in a student who takes up the study of medicine:

> First of all a natural talent is required, for when nature opposes, everything else is in vain; but when nature leads the way to what is most excellent, instruction in the Art takes place, which the student must try to appropriate to himself by reflection, becoming an early pupil in a place, well adapted for instruction. He must also bring to the task a love of labour and perseverance, so that the instruction taking root may bring forth proper and abundant fruits.

Hippocrates prescribed a code of ethics for the medical profession which has guided us for the last twenty-five centuries. This is given in the famous Hippocratic Oath, which Gomperz calls 'a monument of the highest rank in the history of Civilization'.

The Hippocratic Oath

The Hippocratic Oath is: 'I swear by Apollo the physician and Aesculapius and All-Heal, and all the gods and goddesses, that, according to my ability and judgement, I will keep this Oath and this stipulation—to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him and relieve his necessities if required; to look upon his offspring as equal to my own brothers and to teach them this Art if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every mode of instruction I will impart a knowledge of the Art to my own sons and those of my teachers, and to disciples bound by a stipulation and an path of obedience to the law of medicine, but to none other. I will follow that system of regimen which according to my ability and judgement I consider to be for the benefit of my patients and abstain from whatever is deleterious and mischievous. I will give no poison to any one if asked, or suggest any counsel and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practice my Art. I will not cut persons suffering from stone, but will leave that to be done by men who are practitioners of this work. Into whatever house I enter I will go into them for the benefit of the sick, and will abstain from all intentional mischief and harm especially from the seduction of females or males, free man or slaves. Whatever, in connection with my professional practice or even outside of it, I see or hear in the life of men, which ought not to be spoken of abroad, I will not divulge, reckoning that all such things should be kept secret. While I continue to keep this oath unviolated, may it be granted to me to enjoy life and practice of the Art among men for all time. But should I tresspass and violate this Oath may the reverse be my lot.'

Hippocrates combined a scientific outlook with ethics, with modesty and directness of vision. One of his famous aphorisms is :

> 'Life is short and Art is long; the occasion fleeting.
> Experience fallacious and judgment difficult.'

This aphorism has found a place in the literature of most countries.

The Hippocratic Oath, as I have said, has guided the medical profession all the world over for over twenty-five centuries, and still continues to do so. You must have observed that there is good deal in common between this Oath and the oaths of initiation and the convocation or *Samavartna* ceremony of our ancient Ayurveda, and there is no doubt that the Hippocratic Oath derives from the wisdom of the East and the West.

Here in India we enjoy a medical heritage, which is composite and is a wholesome blend of all that is best in the East and the West. While we are proud of Ayurveda, which is indigenous to the Indian soil, we have been fortunate in receiving the Greek contribution to Medicine, partly through direct contact with Greece through Alexander the Great and Greek ambassadors to the courts of Ashoka and other kings, and partly through Arabian Medicine, which came here with the Moslems. This Arabian Medicine, as Professor Browne has said, was that body of scientific and medical doctrine, which is enshrined in books written in the Arabic language, but which is for the most part Greek in its origin, though with Indian, Persian and Syrian accretions. This is what is known as the Unani System of Medicine in India.

Greek Medicine underwent a profound change in Europe owing to the Renaissance in the fifteenth and sixteenth centuries. It was a new spirit, a new desire for knowledge and progress, when people took to observation and experimental enquiry. This was the dawn of the Scientific revolution, which gained greater and greater momentum in the seventeenth, eighteenth and nineteenth centuries, and in the twentieth is progressing at a pace undreamt of before.

It is this movement which gave rise to modern Medicine as it is today.

This modern Medicine came to India through our contact with the Western nations, especially the British.

It is not difficult to realise that modern Medicine has grown out of the old Greek and Ayurvedic medicine, apart from the Egyptian and the Babylonian. And so medical ethics as propounded by Charak and Sushruta and Hippocrates can still guide us today.

During the nineteenth century the profession of medicine was duly organised and the code of ethics authoritatively enforced by the establishment of the General Medical Council in the United Kingdom, which was responsible for medical registration and also looked after the standards of medical education both in the United Kingdom and India. Medical ethics and medical education are closely linked together. By acts of legislature medical councils were established in the different provinces in India between the years 1912 and 1917 for the purposes of medical registration, and supervision of medical education. There was no central statutory co-ordinating authority empowered to maintain minimum standards for the whole country then. After World War I, certain developments took place, and in 1933 the Indian Medical Council Act was passed. The first meeting of the Indian Medical Council constituted under the Act was held in New Delhi on the 9th and 10th of March 1934, which I attended as a Founder Member. The Council was at first concerned only with undergraduate medical education, but under the revised Act of 1956 provision has been made for medical registration as well as post-graduate medical education. The various State Medical Councils as well as the Medical Council of India have framed Codes of Medical Ethics.

Coming nearer home, we have the Mysore Medical Council here which was constituted under the Mysore Medical Registration Act of 1931, which functions like the other State Medical Councils of India. The Mysore Medical Council has framed a Code of Medical Ethics, which every medical practitioner in the State should study carefully. The main principles of this code are three. In his relations towards his colleagues, the medical practitioner should obey the golden rule: 'Whatsoever ye would that men should do to you, do ye even so to them'. In his relations with his patients, their interests should be the highest consideration, *Aegroti salus suprema lex* ('safety of the patient is the supreme law'.) In his relation to the State, to the laws of his country and his civic duties, there is no better guiding principle than the words 'Render, therefore unto Caesar the things that are Caesar's'—in other words, obey all lawful authority.

The Council has also mentioned certain objectionable practices which should be avoided by practitioners.

It must be the endeavour of all of us who belong to the medical profession to maintain the highest standard of ethics in our professional work.

May I remind you of the great compliment paid by Robert Louis Stevenson to the medical profession ?

> He (the physician) is the product (such as it is) of our civilisation; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race. Generosity he has, such as is possible to those who practice an Art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and what are more important, Herculean cheerfulness and courage. So it is that he brings air and cheer into the sick room, and often enough, though not so often as he wishes, brings healing.

PHARMACEUTICS AND ETHICS

Pharmacy is an applied science, whose chief task is to convert crude drugs and chemical substances into suitable medicaments. It also does the compounding and mixing of drugs into suitable combinations. It includes the study of their chemical and pharmaceutical properties. All these processes are highly technical and scientific, and require a sound scientific background on the part of the workers in this field. We need highly trained pharmacists for the the pharmaceutical industry in India, so that they could undertake the task of manufacture of drugs on a large scale, and thus make India self-sufficient in regard to the supply of drugs. But what is still more important is that the pharmaceutical profession should be guided by the same ethical principles which guide the medical profession.

History teaches us that the two professions were one and indivisible in the old days. The physician dispensed his own prescriptions. But as the science of medicine progressed, there was a division of functions and the physician and the the pharmacist gradually drifted apart. But the two professions are still interdependent and closely associated with each other; and their ultimate objective is the same, namely the relief of suffering and pain.

It is therefore imperative that in the discharge of their duties they should both consider the interests of the sick person to be paramount. The pharmacists must ensure that there are no spurious or sub-standard drugs in the market. This was also emphasized by the Pharmaceutical Enquiry Committee, of which I had the honour to be the Chairman.

The Central Pharmaceutical Council, which was constituted in India in 1949, has laid down a code of ethics for the guidance of the profession of Pharmacy. This should be scrupulously followed by all members of the pharmaceutical profession.

MEDICINE AND THE HUMANITIES

There is another aspect of the question of medical ethics to which I would like to make a brief reference. In dealing with a sick person the physician has to consider not only the body but also the mind of the patient. The human body is not merely a machine; it is not like a steam-engine. On the contrary, it possesses a mind, a soul. Medical science thus consists not merely of the laws of physics and chemistry as applied to living matter, whether normal or pathological, but it also takes note of the mind; and it is for this reason that psychosomatic medicine is receiving so much attention nowadays. Medicine thus comes nearer to religion than chemistry or physics or any other science. The study of the history of science tells us that at certain critical points it was the medical man's insistence that the body and the mind, the body and the soul, were together and indivisible, and it was this attitude which helped to keep the humanities linked to some extent with the purely scientific outlook.

The development of ethical values and mastery of the physical world are both necessary for the progress of mankind. The need for ethics is specially imperative in the scientific world today if we are to save this world from utter destruction from atom and hydrogen bombs. It is here that the medical man can play an important part. Says Sir Walter Langdon-Brown :

> In this puzzled, frightened and unhappy age, in which we find ourselves, in this century, which most unfairly blames the 19th for all its distresses, just as children blame their parents, the medical man will have more and more to usurp the province of the priest, and try to bring mental and spiritual healing to a world, which finds the panaceas of organised religion inadequate for its needs.

This is a brief review of the important subject of medical ethics. These ethics should be impressed on the mind of the medical student in his college days, as was the case in the days of Charak and Shusruta.

The medical man in the course of his duties has his responsibilities towards the patient, the people among whom he lives and towards the members of his own profession. His relations with the patient are of paramount importance. It is here that he requires a great degree of patience, perseverance, tact and a discrete sense of secrecy. As the patient places complete confidence in his doctor, it is the doctor's duty to respect that confidence and regard all such information as sacred trust and not reveal it to anybody except when required by the constituted government. For instance, the laws of the State require the notification of certain diseases, and it is the duty of the physician to obey all such laws.

As regards the relationship of the doctor with other members of the medical profession, it is of vital importance that there should be complete understanding, harmony and co-operation amongst them. Unfair competition and undesirable practices should be avoided in their own interests, as well as in the interests of the patients and the public generally. It is their bounden duty to raise the standard of medical relief and pool together their knowledge and experience for the good of all.

The medical man should have a proper pride in his calling; but he should endeavour by good and worthy deeds to increase the public esteem in which it is held. He should appreciate properly the sanctity of his profession. His life should be discreet and sober. He should respect professional opinion, and not stand aloof from movements designed to promote the interests of the profession. In all dealings with patients, the interest and advantages of their health should alone influence his conduct towards them. As their trust in the profession is great, so the obligation to be true to their interest is greater, and any signal failure in this respect is wholly discreditable and inexcusable. The consequences of any breach of this rule may be most serious from a professional point of view, involving even the removal of the offender's name from the medical register. In most instances the individual's conscience is the sole arbiter, for no one can judge motives.

The medical practitioner must not only deal honestly with his fellowmen, but he is called upon to show more than usual benevolence towards them, so as to maintain the honourable tradition by which the physician is regarded as a true friend.

I shall now conclude by communicating to my medical brethren the advice of Charak, which has come down to us across the centuries and which, I am sure, we shall all listen to with profound respect.

Charak says that the supreme ideal of a medical practitioner lies in selfless devotion (*nishkama karma*) to his own profession. He can attain the highest *dharma* by protecting his patients with tender care like his own children. But the physician, who for the sake of his livelihood sells treatment as an article of trade, throws away heaps of gold and collects clods of mud in return for them. On the contrary he who devotes himself to the giving of treatment freely out of compassion for living creatures attains the highest happiness (*moksha*), for there is no other gift in the world superior to the gift of life.

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CHAPTER VII

GAUTAMA BUDDHA— THE INCOMPARABLE PHYSICIAN*

TODAY is Vaisakh Purnima—a sacred day in the annals of Buddhism. It was on the full moon day in the month of Vaisakh, that Lord Buddha was born; it was on this day, that He achieved enlightenment under the Bodhi tree at Gaya; and it is also the day on which He finally attained Parinirvana.

It is appropriate that on this day we should celebrate the 2,500th Anniversary of that Event. These celebrations have been going on in the Institute since the 17th of May 1956.

The Buddha is deeply enshrined in the hearts of all of us. The message He gave to humanity is as universal, fresh and full of meaning today, as it was during His lifetime. He was born especially to free humanity from sorrow and suffering. He was essentially humane and full of compassion for all mankind.

Once He thus described Himself :

> Brethren, I am a Brahmin given to begging; my hands are ever pure, I am wearing my last body. Incomparable Physician and Surgeon am I.
>
> (*Iti-Vuttaka*-100)

Incomparable Physician and Surgeon truly!

As a healer of human ailments, bodily as well as mental and spiritual, He was indeed incomparable. The fundamental emphasis in His teachings was on treating all life with respect and having compassion for all livings things—doctrines which are the very foundations of the art and science of medicine.

Every great religion has a central idea, on which rests its whole philosophy of life. With Christianity it is Charity; with Hinduism, Realization; with Judaism, Law; with

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* An Address delivered at the Indian Institute of World Culture, Bangalore, at the closing Special Meeting for Buddha Week, 24 May 1956.

Zoroastrianism, Purity; with Islam, Faith; and with Buddhism, Suffering or *Dukkha*.

Dukkha forms the main element of Buddhism. The Buddha often emphasized that He came into the world solely for the reason that He might once and for ever relieve humanity of its *Dukkha*. It is the fundamental belief and cardinal tenet of His entire system.

What is Dukkha ? He answered :

> This 'O Monks, is the Aryan Truth of Dukkha.
>
> Birth is Dukkha; Old Age is Dukkha; Sickness is Dukkha; Death is Dukkha; to be united with the unloved one is Dukkha; not to obtain what one desires is Dukkha; in short the five-fold clinging to this Earth is Dukkha.

To appreciate fully the role of Lord Buddha as a great Physician who healed suffering and sorrow, let me recall at the outset some of the main events in his life.

He was born under the Sal tree in Lumbini Park in the neighbourhood of Kapilavastu, which is near the border of Nepal. As a token of reverence for Lord Buddha, Emperor Asoka erected here a pillar bearing the inscription—'Here was the Enlightened One born' (*Hida Bhagavam Jateti*).

At Kapilavastu resided the chiefs of the Sakya clan, amongst whom Siddhartha was born. Siddhartha's father, Suddhodana, and his mother, Maya Devi, both belonged to this clan. His father was the ruler of the place. It is said that the mother of Siddhartha died seven days after his birth, and that he was brought up by his maternal aunt, Prajapati Gautami. He spent his early years devoted to education, in ease and comfort. At the age of sixteen he was married to Yasodhara and they had a son, whose name was Rahula. For many years he saw nothing but the beautiful and the pleasant. But there came a time when he wanted to see the world beyond the gates of the palace. This he did.

During these visits, he first saw an old man who was dressed in rags and looked extremely haggard, infirm and pitiful. Then he saw a sick man suffering from some deadly plague, who lay on the ground moaning and complaining of severe pain. Siddhartha went and lifted him up. But as he did not know what was wrong with him, he asked Channa his charioteer, who replied:

Great Prince ! this man
Is smitten with some pest; his elements
Are all confounded: in his veins the blood,
Which ran a wholesome river, leaps and boils
A fiery flood; his heart, which kept good time,
Beats like an ill-played drum-skin, quick and slow;
His sinews slacken like a bowstring slipped;
The strength is gone from ham, and loin, and neck,
And all the grace and joy of manhood fled: ..
This is a sick man with the fit upon him.

(*The Light of Asia*)

And then after a while he saw a lot of people wailing and crying, and a bier upon which there lay a corpse, which was subsequently cremated. Then spake the Prince :

"Is this the end which comes
To all who live ?"
"This is the end that comes
To all," quoth Channa;

. . .Siddhartha turned
Eyes gleaming with divine tears to the sky,
Eyes lit with heavenly pity to the earth; . . .
Then cried he, while his lifted countenance
Glowed with the burning passion of a love
Unspeakable, the ardour of a hope
Boundless, insatiate: "Oh ! suffering world;
Oh ! known and unknown of my common flesh,
Caught in this common net of death and woe,
And life which binds to both ! I see, I feel
The vastness of the agony of earth,
The vainess of its joys, the mockery
Of all its best, the anguish of its worst;
Since pleasures end in pain, and youth in age,
And love in loss, and lite in hateful death,
And death in unknown lives, which will but yoke
Men to their wheel again to whirl the round
Of false delights and woes that are not false.
. . .Channa ! Lead home again !
It is enough ! Mine eyes have seen enough."

The sight of old age, disease and death affected the young Siddhartha profoundly. This was the turning point in his life. At the age of about 29 he renounced all family ties, and retired to the forest to seek enlightenment and to find the cause of sorrow and suffering and the means of alleviating them.

After this great renunciation, he placed himself under the spiritual guidance of a number of teachers, and ultimately enlightenment came to Him at the age of about thirty-five, under the Bodhi tree at Gaya.

When He saw that sorrow and suffering oppressed all mankind, compassion touched Him: He made up his mind to preach the great truths that He had discovered. With this object He went to Banaras, which was the centre of religious thought at the time. It was at Saranath, near Banaras, that He preached His first sermon.

I have visited both Gaya and Saranath. How I wished when I was there, that Lord Buddha might appear once again and preach another sermon to mankind to end all sorrow and ill-will, and to bring peace and happiness on earth! There is much need for His teachings in the world today.

He preached the Four Great Truths and the Noble Eightfold Path. He collected disciples around Him and made many converts amongst whom were His own father, His wife, and His son. Ananda, his constant companion, was a cousin of His. Among the many patrons and benefactors of the Buddha is the famous name of Kivaka, who was physician in ordinary to Bimbisara, King of Magadha. He was appointed by the King to attend as a physician on the Buddha and his followers. Lord Buddha died at Kusinara in 544 B.C. at the ripe age of eighty.

The Buddha, you will observe, was led to a life of renunciation owing to the existence of disease and death around Him. Thus the starting point of Buddhism is not dogma or belief in the supernatural, but the fact of human sorrow and suffering. Its goal is to find a refuge from the miseries of this world. He impressed on men the need of leading an intellectual and moral life of self-discipline and self-culture. He pointed to the cause as well as to the remedy for all the maladies of the body and the mind. It can readily be imagined how under these circumstances the term 'Incomparable Physician' is so appropriately applicable to Him; He is a Healer, in the best and broadest sense of the word, of all our bodily and mental troubles.

He advised that men in order to be happy must get rid of all hatred and malice, all indulgence in lower desires, all lying and evil thoughts. Let them substitute good thoughts and worthy desires, feelings of charity and compassion, and be serene and composed. He showed in His own life the effects of the practice of His precepts. He taught what was practicable and reasonable, and He has exerted a mighty influence upon the human race.

His was an enquiring mind. He did not accept things as they were. He had the courage and initiative to show where things were wrong, and how to put them right. The Buddha was essentially a man of action. He based His practical advice on the facts of man's existence and developed His practical philosophy by observation and minute study of human nature. Thus the Dhamma He preached concerned itself with the affairs of life as observed from day to day. This is particularly evident from the following incidents in His life, where He plays the role of a true physician:

(i) TEND THE SICK

Now at that time a certain brother was suffering from dysentery and lay where he had fallen down in his own excrements.

And the Exalted One was going His rounds of the lodgings, with the venerable Ananda in attendance, and came to the lodging of that brother.

Now the Exalted One saw that brother lying where he had fallen in his own excrements, and seeing him He went towards him, came to him and said 'Brother, what ails you?'

'I have dysentery, Lord.'

'But is there anyone taking care of you, brother ?'

'No, Lord.'

'Why is it, brother, that the brethren do not take care of you ?'

'I am useless to the brethren, Lord: therefore the brethren do not care for me.'

Then the Exalted One said to the venerable Ananda: 'Go you, Ananda, and fetch water. We will wash this brother.'

'Yes, Lord', replied the venerable Ananda to the Exalted One. When he had fetched water, the Exalted One poured it out while the venerable Ananda washed that brother all over. Then the Exalted One taking him by the head and the venerable Ananda taking him by the feet, together they laid him on the bed.

Then the Exalted One, in this connection and on this occasion, gathered the Order of Brethren together, and questioned the brethren, saying:

'Brethren, is there in such and such a lodging a brother who is sick ?'

'There is, Lord.'

'And what ails that brother ?'

'Lord, that brother has dysentery.'

'But, brethren, is there anyone taking care of him ?'

'No, Lord.'

'Why not ? Why do not the brethren take care of him ?'

'That brother is useless to the brethren, Lord. That is why the brethren do not take care of him.'

'Brethren, ye have no mother and no father to take care of you. If ye will not take care of each other, who else, I ask, will do so? *Brethren, he who would wait on me, let him wait on the sick.*'

'If he have a teacher, let his teacher take care of him so long as he is alive, and wait for his recovery. If he have a tutor or a lodger, a disciple or a fellow lodger or a fellow disciple, such would take care of him and await his recovery. If no one take care of him, it shall be reckoned an offence.'

(*Vinaya Mahavagga*, VIII, 26.)

Thus you see how tenderly Lord Buddha himself nursed the sick and enjoined his followers to do the same.

(ii) VISITING THE SICK

Thus have I heard: Once the Exalted One was staying near Rajagraha in the Great Grove, at the Squirrels' Feeding-ground.

On that occasion the venerable Vakkali was staying in the potter's shed, being sick, afflicted, stricken with a sore disease.

Now the venerable Vakkali called to his attendants, saying: 'Come hither, friends! Go ye to the Exalted One and, in my name worshipping at the feet of the Exalted One, say unto Him: 'Lord, the brother Vakkali is sick, afflicted, stricken with a sore disease. He worships at the feet of the Exalted One.' And thus do ye say: "Well were it, Lord, if the Exalted One would visit brother Vakkali, out of compassion for him.'

The Exalted One consented by His silence. Thereupon the Exalted One robed Himself, and, taking bowl and robe, went to visit the venerable Vakkali.

Now the venerable Vakkali saw the Exalted One coming, while yet He was afar off, and on seeing Him he stirred upon his bed.

Then said the Exalted One to the venerable Vakkali: 'Enough, Vakkali! Stir not on your bed! There are these seats made ready. I will sit there.' And He sat down on a seat made ready.

So the Exalted One sat down and said to the venerable Vakkali:

'Well, Vakkali, I hope you are bearing up. I hope you are enduring. Do your pains abate and not increase? Are there signs of their abating and not increasing?'

'No, Lord, I am not bearing up. I am not enduring. Strong pains come upon me. They do not abate. There is no sign of their abating, but of their increasing.'

'Have you any doubt, Vakkali? Have you any remorse?'

'Indeed, Lord, I have no little doubt, I have no little remorse.'

'Have you not anything, Vakkali, wherein to reproach yourself as to morals ?'

'Nay, Lord, there is nothing wherein I reproach myself as to morals.'

'Then, Vakkali, if that is so, you must have some worry, you must have something you regret.'

'For a long time, Lord, I have been longing to set eyes on the Exalted One, but I had no strength enough in this body to come to see the Exalted One.'

'Hush, Vakkali ! What is there in seeing this vile body of mine ? He who seeth the Dhamma, he seeth me: he who seeth me, Vakkali, seeth the Dhamma. Verily, seeing the Dhamma, Vakkali, one sees me: seeing me, one sees the Dhamma.'

(And when the Master had discoursed on the impermanence of all things, He went away.)' (*S. N.* III, 120.)

You will note how Lord Buddha counsels the sick, not to attach any importance to the mere fact of seeing His body, but to see the Dhamma. 'Seeing the Dhamma, one sees Me.' It is really the Dhamma which gives real consolation and satisfaction to the sick man.

(iii) PATIENT AND NURSE

'There are five characteristics, brethren, possessed of which a sick man is hard to nurse.

'He will not take remedies, or he observes no moderation in taking remedies, or he does not follow the drugs prescribed, does not disclose the real nature of his ailment to the nurse who desires his welfare; (nor does he tell him) whether his sickness wanes or waxes or stands still: lastly, when he is impatient of his bodily feelings that arise, painful, sharp, cutting, bitter, grievous, unpleasant, life-destroying.

'Such, brethren, are the five characteristics possessed of which a sick man is hard to nurse.

'And the five characteristics (which make him easy to nurse) are the opposites of these.

'There are five characteristics, brethren, possessed of which one is of no use as a nurse. One is incapable of prescribing medicine, one does not know the proper remedies, what is good and what is bad, one administers what is unfit and does not administer what is fit; *one nurses the patient out of greed and not out of charity*; one is squeamish about the removal of excrements, saliva, or vomit; one is incapable of teaching the patient from time to time with pious talk, incapable of cheering him, of stirring him, and comforting him.

'Such, brethren, are the five characteristics possessed of which one is of no use as a nurse.

'And the five characteristics (which make one a good nurse) are the opposites of these.' (*Vinaya Pitaka Mahavagga* VIII, 25.)

These remarks apply to both Doctor and Nurse.

These fundamental truths are well-known to all of us who belong to the profession of medicine. They are as much a source of guidance today as they were in the Buddha's time.

(iv) TYPES OF SICK MEN

'There are these three sorts of sick men, brethren, to be found in the world. What three ?

(i) 'Herein, brethren, a sick man, whether he obtain proper diet or not, whether he obtain proper medicine or not, whether he obtain proper nursing or not, does not recover from his sickness.

(ii) 'Herein, brethern, a sick man, whether he obtain all these things or not, nevertheless recovers from his sickness.

(iii) 'Herein, brethren, a sick man, though he receive not any of these things, recovers from his sickness. (*Angutha Nekaya* I, 120)

These observations are also well-established truths and are appreciated by all practitioners of medicine.

(v) COMFORTABLE WORDS

Thus have I heard: The Exalted One was once staying among the Bhaggi, at Crocodile-Haunt in Bhesakala Grove in the Deer Park. Then the house-father Nakulapitar came to the Exalted One, saluted Him, and sat down at one side.

As he sat there, the housefather Nakulapitar addressed the Exalted One, saying: 'Master, I am a broken-down old man, aged, far gone in years, I have reached life's end. I am sick and always ailing. Moreover, Master, I am one to whom rarely comes the sight of the Exalted One and the worshipful brethren. Let the Exalted One cheer and comfort me, so that it be a profit and a blessing unto me for many a long day.'

'True it is, true it is, housefather, that your body is weak and cumbered! For one carrying this body about, housefather, to claim but a moment's health would be sheer foolishness. Wherefore, housefather, thus should you train yourself: '*Though my body is sick, my mind shall not be sick.*' Thus, housefather, must you train yourself!'

Then Nakulapitar, the housefather, welcomed and gladly heard the words of the Exalted One, and rising from his seat he saluted the Exalted One by the right and departed.' *S.N.* III

How wise these words: '*Though my body is sick, my mind shall not be sick!*'

The great contribution of the Buddha as an 'Incomparable Physician' is the compassionate and tender manner in which he attended to the needs of body and mind, of the sick, and the lofty ethical standards He laid down for the guidance of those who practise the art and science of Medicine.

Suffering is inexorably bound up with life. The word 'Dukkha' translated as 'Suffering' has a wide meaning. It includes every state of physical and mental distress, and is associated with diseases both of mind and of body. Buddhism attempts to find a remedy for these. In this connection I may perhaps remind you of the Four Noble Truths and the Noble Eightfold Path. They constitute the fundamental doctrines of the Buddhist faith.

The Four Noble Truths are :

1. First Noble Truth. *Sorrow and Suffering:* These are inherent in all phenomenal life. Suffering includes all bodily and mental discomfort and pain.

2. Second Noble Truth. *The Cause or Origin of Suffering :* This is ignorance and desire born of ignorance, i.e. greed, infatuation with sense-objects, etc.

3. Third Noble Truth. *The Extinction of Suffering :* This comes from the realization that there is an escape from suffering through self-discipline...

> Enraptured with lust, enraged with anger, blinded by delusion, overwhelmed, with mind ensnared, man aims at his own ruin, at other's ruin, at the ruin of both parties, and he experiences mental pain and grief. But if lust, anger and delusion are given up, man aims neither at his own ruin, nor at other's ruin, nor at the ruin of both parties, and he experiences no mental pain and grief. This is Nibbana immediate, visible in this life, attractive and comprehensible to the wise.
>
> (*The Word of the Buddha*)

4. Fourth Noble Truth. This is the truth of the Noble Eightfold Path that leads us step by step beyond the realms of suffering, straight to peace and refuge.

The Noble Eightfold Path consists of :

(1) *Right understanding :* The understanding of Right Knowledge, the understanding of the impermanence of all external phenomena; right views, unprejudiced, intelligent and tolerant.

(2) *Right mindedness :* This implies thoughts free from lust, thoughts free from ill-will and thoughts free from cruelty.

(3) *Right Speech :* Truthful, honest and kindly speech. One should abstain from lying, talebearing and harsh language.

(4) *Right Behaviour or Action :* Peaceful and peace-bringing, upright and benevolent.

(5) *Right Living :* Any occupation that neither harms nor hinders any living being should be followed. One's vocation should not violate the law of non-violence, harmlessness and the Unity of life beneath the diversity of all its forms. And further, only he who is free form violence is capable of right meditation.

(6) *Right Effort :* The persevering effort to control thoughts and deeds, to destroy that which is harmful or demeritorious, to cultivate that which is helpful or meri-

torious, to overcome ignorance and desire, and thus to progress on the Path.

(7) *Right Attentiveness :* Keen observation of life, and all personal thoughts, acts, intentions and their causes: observation of the body and the mind. Recollection of past experience, awareness of present experience and thoughtfulness as to the future.

(8) *Right Concentration :* Right concentration in its widest sense is that kind of mental concentration which is present in every wholesome state of consciousness, and is, therefore, accompanied by Right-mindedness, Right Effort, and Right Attentiveness.

The Four Noble Truths and the Noble Eightfold Path are capable of universal application, and to us in the medical profession they are of special significance as the effective means for alleviating both bodily and mental pain and suffering. This is the great contribution of Buddhism to the noble Art of Healing.

India is indebted to Buddhism for many things, such as architecture, sculpture, painting and engraving. It is also greatly indebted to it for science and culture, and especially for the growth of medicine. The best era of Indian medicine was contemporaneous with the growth of Buddhism. Asoka (third century B.C.) and other Buddhist Kings established public hospitals and schools of medicine attached to them. This was in accordance with the injunction of the Buddha, that whosoever would wait on Him should wait on the sick. Charaka, the author of the well-known *Charaka Samhita*, was the court physician of the Buddhist King Kanishka.

Nagarjuna, the renowned Buddhist Sage, infused new life into the science of Ayurveda. To his lofty intellect and wise scholarship, India owes the revised edition of *Susruta* now in use. The latter part of the treatise which bears the name *Uttaratantra* is entirely the result of Nagarjuna's independent research and thought. In the true spirit of a real Buddhist, Nagarjuna popularized the science of Ayurveda by teaching it without reserve to all classes, without distinction of caste. Even now the work of Ayurveda read by beginners is the work of Vagbhata, a Buddhist.

It is not unlikely that Ayurvedic medicine influenced Greek medicine. At the time of Alexander's Indian expedition (327B.C.) Hindu physicians and surgeons enjoyed a great reputation for superior knowledge and skill. Some writers even maintain that Aristotle, who lived about this time, got many of his ideas from the East. There is no doubt that there was close contact between India and Greece in those days, for we learn that, apart from Alexander's visit, Megasthenes was sent as an ambassador from Greece to the court of Chandragupta, King of Magádha. When Asoka ascended the throne he was largely inspired by the Buddha and His teachings. The original temple at Bodh-Gaya was built by Asoka. This great monarch had contacts with the Kings of Syria, Egypt, Macedonia, Ceylon and other countries, where he spread the teachings of the Buddha. Thus our modern medicine, which is said to be the direct outgrowth of the old Greek medicine, also inherits the noble teachings of the Buddha, the Incomparable Physician.

All sciences and arts were studied in the chief centres of Buddhist civilization, such as the great Buddhist University of Nalanda. It is said that the very bloom of the intellectual life of India, whether it found expression in Buddhist or Brahmanical works, was contemporaneous with the period in which Buddhism flourished. Buddhism spread to Ceylon, Tibet, China, Korea, Japan and other countries in South-East Asia. Wherever Buddhism entered the life of a people, it always gave it refinement and embellishment. For instance, in Japan Buddhism introduced art and medicine. For centuries there education as well as the care of the sick and the poor was in the hands of Buddhists.

Like Lord Jesus Christ, Lord Buddha left no written records. But whatever He said made a deep and lasting impression on the minds of His listeners, who passed on the teachings of the Master to their successors. His followers wrote down conscientiously what they had heard. These writings comprise the main source of inspiration for us today. His words travelled to many lands and transformed the lives of the people.

It is a remarkable fact in history, that in the sixth century B.C., there was a powerful mental ferment over the whole area between Greece on the one side and India and China on the other. Almost simultaneously in point of time lived Buddha and Zoroaster, Lao Tze, Confucius, Thales and Pythagoras, Parmenides and Empedocles. These great minds appearing in widely separated centres of civilization made a great contribution, which resulted in a leap forward in thought and a new birth of ethics. They in fact put humanity on its feet and gave it both dignity and grace.

Medicine is part of the general culture of the human race and its history is part of the general history of civilization. With the awakening of the human intellect and the revival of learning and ethics in the sixth century B.C., medicine too took a great step forward, and this was due in no small extent to the contribution of Lord Buddha, which was threefold :

(i) He introduced the highest ethical principles in the treatment and nursing of the sick. This he did by both personal example and precept. He condemned those who treated the sick out of greed and not out of charity.

(ii) By introducing the method of direct observation in studying human problems, he gave a great impetus to the progress of medicine which took place in India during His time and for some centuries after Him.

(iii) In treating a sick person, He paid equal attention to his body and his mind. He asked the patient to train himself thus: 'Though my body is sick, my mind shall not be sick.'

There is need at the present juncture to go back to the Buddha and listen attentively to His words, which still echo across the centuries, words full of wisdom, compassion and love, which will serve as a soothing balm to the sick and sorrowful humanity of today, especially in this age of atom and hydrogen bombs.

The Buddha had schooled Himself to strict discipline, and through that self-discipline there emerged such rare sweetness, which imprinted itself on the minds of those who came in contact with Him. The Buddha is depicted through the ages seated in a calm and serene manner, gently smiling upon mankind and the world around Him. That smile, which is so full of compassion and loving kindness, will be there till the end of time. He was a man who had attained supreme happiness and who was anxious to make all others as happy as He was. In this He plays the true role of an Incomparable Physician, who is there to heal the physical as well as the mental and spiritual ailments of the human race.

May I commend to you Lord Buddha's last words which He addressed to Ananda :

> Therefore O Ananda, be ye lamps unto yourselves. Be ye places of refuge to yourselves. Betake yourselves to no external refuge. Hold fast to the Truth as a lamp. Hold fast as a refuge to the Truth. Look not for refuge to any one except yourselves. And whosoever, Ananda, either now or after I am dead, shall be lamps unto themselves, shall betake themselves to no external refuge, but holding fast to the Truth as their lamp and holding fast to the Truth as their refuge, shall look not for refuge to anyone besides themselves—it is they, Ananda, among my Bhikkhus who shall reach the very topmost height ! But they must be anxious to learn.

These noble words contain a message for all humanity and will be there to comfort and guide us for all time.

Today we honour Him and pay our sincere homage to Him, as a great religious Teacher, a great Lover of mankind, and the finest flower of the soil of India, the greatest Indian in recorded history, as our Prime Minister has said. This Incomparable Physician prescribed effective remedies for our sorrows and sufferings, remedies which are capable of universal application.

It is my earnest prayer that Lord Buddha may bless us all; that He may always enlighten our path with His eternal light; and that, like the true and Incomparable Physician that He was, He may continue to shower His sublime gifts of love, compassion, kindness and benevolence on the human race; and that by removing all sorrow and suffering He may promote everlasting peace and happiness on this Earth.

O Serene, O Free, thou Soul of infinite Sanctity,
Cleanse this Earth of her stains, O Merciful.

(Rabindranath Tagore)

CHAPTER VIII

THE ORIGIN OF LIFE*

THE appearance of life is the most significant fact in the evolution of the world. We are conscious of life within us, and witness it all around us, and should like to know how it originated on the Earth. This is a natural curiosity, and human intellect since the dawn of civilization has attempted to enquire into it and frame some sort of hypothesis about it.

The living substance of animal and vegetable organisms forms part of the mass of matter that composes the Earth. There are no fundamental differences between living beings and lifeless substances, so far as their chemical composition is concerned, for the elements that constitute the former, constitute the latter also. The differences between organic and inorganic substances consist merely in the mode of union of elements. Living substance should not be regarded as something mystical, which has no connection with any other substances, but is a part of the matter which constitutes the Earth's crust.

The composition and the form of the living substances that now cover the Earth's surface, are to be considered from the same point of view, as, for instance, the composition of the present Sea. Just as the Sea with its salt could not have existed, as it does now, before the water had appeared on the Earth in a liquid state, so also living substance could not then exist with its present composition, for it contains on the average more than 50 per cent of water. But just as water was obliged to assume its present form when certain conditions in the Earth's evolution were fulfilled, so living substance was obliged gradually to take on its present character in course of time. The separation of living substance out of the mixture of materials of the Earth's crust is only one result of the Earth's evolution, like the separation of rocks, salts and water.

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*An address delivered at the Indian Institute of World Culture, Bangalore, on 23 July 1960.

Thus we have to consider the conditions that must be fulfilled in order that the life of the organism can exist. These conditions are both external and internal. The *external conditions* consist of adequate supplies of food, water and oxygen. *Food* is needed to make good the wear and tear that is constantly going on as the result of metabolic processes. Green plants construct their living substance out of inorganic materials. Animals, without exception, need organic compounds such as proteins, carbohydrates, fats etc. while fungi occupy an intermediate position as they can take nitrogen from inorganic salts, although they require organic compounds for their carbon. *Water* is a vital necessity as the living substance or protoplasm is liquid in consistency. Metabolism is compatible only with the liquid state. As regards *oxygen*, Priestley recognised its fundamental importance for the maintenance of life upon the Earth. In respiration, oxygen is taken in by the living organism, and CO_2 is given off, indicating that carbon is oxidised in it. When oxygen is withdrawn completely, different kinds of cells perish after different intervals of time. For example, the cells of the nervous system are most sensitive to the withdrawal of oxygen. Thus, the higher vertebrates perish very soon in the absence of oxygen.

There are some apparent exceptions to this principle :

a) *Green plants :* They take up CO_2 and give off oxygen. So long as the sunlight acts on their green leaves, they need no oxygen. A green plant can thus be kept alive in a space free from oxygen, if it be allowed to stand in the sunlight and receive CO_2. This, however, is not the process of respiration; it is the process of the plant's assimilation.

b) *Anaerobic Bacteria :* These organisms can exist in the absence of oxygen. But many of them can live in the presence of oxygen also. It appears that they can withdraw oxygen from the salts of the alkalies that exist in their media and also from fixed chemical compounds.

(c) *Spores of Bacteria and Seeds of plants etc.* : They are in a condition of latent life where no metabolic processes occur. Where no metabolism exists, no oxidation processes take place. They require neither food nor water, nor oxygen and yet are capable of life.

Apart from food, water and oxygen, suitable *temperature* is essential for the maintenance of life. Organisms perish when the living substance is frozen solid for a certain length of time, or they are heated up to a point, when the proteins in them coagulate.

Suitable *external pressure*, either in Air or Water, also has great significance for life. The most important thing for animals is the partial pressure of oxygen, and for plants it is that of CO_2. As regards water pressure, it is found that living organisms exist even in the great depths of the Sea, where darkness always prevails and bodies are subject to pressure of several hundred atmospheres. This pressure is so great, that when these animals are brought to the surface of the sea and exposed to the ordinary atmospheric pressure, they burst.

The *internal conditions* in the living cell which have to be fulfilled for its continued existence are the maintenance of natural coherence and correlation of the essential parts of the organism. In this connection, one may emphasise the vital necessity of close relationship between the nucleus and the protoplasm of the living cell. Only where these two are united, can life continue to exist.

THEORIES REGARDING THE ORIGIN OF LIFE

It is a well-known fact that the Earth was once a fiery ball like the Sun from which it came. Its hard rocks and solid metals were then in a molten state. Its liquid nucleus was surrounded by an atmosphere of incandescent gases. Its particles were in violent motion, and its temperature measured thousands of degrees. The fact that once the Earth was in a condition in which its temperature was enormous and not a drop of water existed on it is important in all speculations upon the origin of life on Earth, for the external vital conditions, which I have just mentioned, were then wanting. In the light of this, we shall consider briefly various views upon the origin of life founded upon a scientific basis.

1. *Doctrine of Spontaneous Generation.* Since there was a time in the evolution of the Earth when the existence of the living substance that now inhabits its cool surface was absolutely impossible, living substances must have arisen from lifeless substances at some late period.

The question is how and under what conditions were the first organisms created ? All the ancient philosophers including Aristotle (384-322 B.C.), believed that animals such as worms, insects and even fishes could come into existence out of mud. Aristotle postulated three modes of propagation of life, namely, natural, artificial and spontaneous. He believed that the substances from which life comes possess a soul, which is the essence of life or Entelechy. The body possesses certain characteristics due to the proportion of certain elements of which it is composed. For instance, earth is the essence of plants, water of aquatic animals, and air of the land creatures. The solar warmth of the sun gives life to matter spontaneously, and the animal warmth is needed to give rise to the form of living things derived from themselves.

The Aristotelian doctrines, especially that of spontaneous generation, were the current belief in Europe till the onset of the Renaissance in the seventeenth century.

These ideas, however, were later put aside, but they came into prominence with the introduction of the microscope and the discovery of minute micro-organisms. It was fully believed that these organisms were produced by spontaneous generation out of dead substance. But it was later established that they did not originate spontaneously, but were developed from germs that were previously contained in the substances, or came into the vessel from the air. It was found that if the substances were freed from germs by previous boiling, and if germs were prevented from entering through the air, the development of these organisms (Infusoria and Bacteria) did not take place. In fact, it is through continual strife over this doctrine that the modern science of Bacteriology has developed, and it was due largely to the efforts of Robert Koch and Louis Pasteur that the doctrine was definitely refuted.

But the matter is of no consequence as to whether at the present time living substances on the Earth arise spontaneously or not. There was a time when the Earth was in a condition that excluded all organic life. Living substances must, therefore, have originated at one time in the earth's development from lifeless substances. This time, according to Haeckel, cannot be dated earlier than when water vapour suspended throughout the atmosphere had been precipitated in the form of liquid. The first organisms that arose by spontaneous generation must have been not cells but the simplest organisms that can be imagined—structureless, formless, lumps of protein. These living protein lumps arose from the mutual action of substances dissolved in the Sea. Haeckel calls these organisms 'Monera'; and from these have been derived by continuous descent the cells and all forms of organisms that inhabit the Earth's surface. This is the doctrine of spontaneous generation in its present form.

2. *The Theory of Cosinozoa : Richter's Theory*. This theory arose in opposition to the theory of spontaneous generation. Its founder was Richter. It assumes that germs of lower organisms capable of life move about in space. These micro-organisms are continually being thrown from heavenly bodies. Somewhere in space there have always been heavenly bodies in which life has existed in the form of cells. The existence of living cells in the Universe is eternal. Organic life therefore has never originated, but has always been transferred from one world to another.

It is possible that organic germs can endure a long journey through space from one heavenly body to another without food and water, for apparently dead organisms, such as the spores of bacteria, can continue in an apparently dead condition without food and water and yet revive under suitable conditions.

Thus, according to this theory, the question is not one of the origin of life on Earth, but the manner in which it came from other worlds. The germs moving about in space settled on Earth and finding a suitable medium developed and grew, and by a process of evolution have given rise to all the divers forms seen today.

3. *Theory of Continuity of Life : Preyer's Theory.* According to this theory, organisms are always derived from other organisms similar to them and no organism has originated without a parent. It is suggested that living substance is the primary thing, and that lifeless substance is derived from it by excretion. The continuity in the derivation of living substance has never been broken.

The conclusion following from this hypothesis is interesting. As life upon the Earth has never been derived from lifeless, but always from living substances, life must have existed when the Earth was in an incandescent condition. The conception of life, therefore, has been given a very wide scope. The picture of the derivation of life according to Preyer is somewhat like this:

Originally the whole molten mass of the Earth's body was a single giant organism. The powerful movement that its substance possessed was its life. When the Earth began to cool, the substances that could no longer remain in the liquid state at that temperature, e.g. heavy metals, were separated and formed dead organic substances. This process continued. These inorganic bodies were not able to return again into the hot liquids, which gradually decreased in quantity, because of progressive cooling. After this had occurred, the protoplasm must have remained over. The heavy metals once in organic combination no longer melted into the circulation from which they had been cast out. Quoting the words of the author himself : 'They are the signs of *rigor mortis* of the gigantic, cooling, primaeval organisms, whose breath was luminous iron vapour, whose blood was liquid metal and whose food was heavenly bodies.'

By further cooling there appeared more complex compounds and denser bodies. Thus, the first forms of plants and animals resembling one another and made possible by progressive differentiations were able to exist.

4. *Pfluger's Theory*. Pfluger discusses the problem in intimate connection with the facts of physiological chemistry. The essential point in his theory is the chemical constitution of proteins, with which life is inseparably united.

The difference between dead protein, such as egg albumen and living substance, is that the latter is constantly breaking down. This constant decomposition is due to the presence of oxygen, which occurs in the living protein molecule and is continually being received by its respiration. During decomposition CO_2 is formed. The oxygen in the protein molecule makes it very labile.

The comparison of decomposition products of living proteins and those obtained by artificial oxidation of dead protein shows that the non-nitrogenous products of the two are the same, but their nitrogenous products are entirely different. There is a fundamental difference with regard to nitrogenous radicals. Nitrogenous decomposition products of living proteins are (i) such substances as uric acid, creatinine, nuclein bases, e.g. guanin, xanthin, hypoxathin, etc., which contain cyanogen (C.N.) as a radical; and (ii) such substances as urea (the most important of all decomposition products), which can be produced artificially from cyanogen compounds by the re-arrangement of atoms. Products of decomposition of dead protein are CO_2 and ammonia. This shows that the living protein contains the radical CN and thus differs fundamentally from dead protein.

When the dead protein of food is converted into the living protein of the cells, the atoms of nitrogen go into a cyanogen-like relation with carbon, with the absorption of considerable heat.

One might narrate the sequence of events as follows:

When the Earth was wholly or partially in a fiery state, cyanogen compounds were formed. Other constituents of protein, such as hydrocarbons and alcohol radicals, likewise arose synthetically in heat. In other words, life was derived from fire. The first protein to arise was living matter, with the property of attracting similar constituents and thus growing ad infinitum. Thus living protein has no constant molecular weight. It has a huge molecule undergoing constant transformation and decomposition.

Critical review of different theories. From the views just put forward two notions appear to stand out prominently, namely:

(a) Either organic life began to exist at some one time
or

(b) it has existed from eternity.

The former notion is the basis of the doctrine of spontaneous generation and of Pfluger's theory; the latter, that of the theory of Cosmozoa and partly of Preyer's theory of continuity of life.

The theory of Casinozoa supposes that life has existed in the Universe from eternity and has simply been transferred from one world to another. Direct contradiction of this view is impossible, and yet it is hardly probable that living substance has existed from eternity and has never originated from inorganic substance. It is a well-known fact in plant physiology that living substance is constantly being formed in the plant cell from simple inorganic compounds, such as CO_2, water, nitrates, sulphates etc. Here there is intimate relation between organic and inorganic nature. Living substance is continually originating from lifeless substance and is continually being decomposed again into lifeless substance.

The origin of life on the Earth as suggested by Pfluger has some degree of probability in its favour. When the Earth was incandescent, the compounds of Cyanagen were formed, which were forced into combination with other compounds of carbon, whose origin likewise was due to the great heat. When water was precipitated, these compounds, entered into chemical relation with water. It dissolved salts and gases, and then originated living protein. This first protein was very simple and showed no differentiations. It was not yet separated into protoplasm and nucleus, but was homogeneous in all its parts.

This conception may be modified in the future, but it seems probable. Further speculation is useless, as the conditions prevailing on Earth during its period of infancy, when life first appeared, are unknown. The subsequent history of this Monera is narrated by Darwin's Theory of Evolution, which teaches that all the organisms that live today and have lived at any time upon the Earth's surface are derived in an unbroken descent from the first and simplest living substance that originated from lifeless substance. Nature has preserved certain records, in which is found the history of the evolution of the organic race written more or less completely.

(a) *Palaeontology*. The first record is in Palaeontology or the science of fossils. Fossils are the testimony that nature has laid down in the strata of the Earth's crust regarding the existence and character of earlier organisms. Thus, the ancestry of the existing animals and plants is learnt.

(b) *Comparative Anatomy*. This deals with the second record, which is presented in the similarities of the individual organs of existing organisms. These records are very incomplete, for the existing organisms are the surviving twigs and branches of the old genealogical tree. The other twigs and branches have perished. The fossils supplement the facts of comparative anatomy to a certain degree in a very satisfactory manner.

(c) *Embryology*. This deals with the third important record. The germs of plants and animals from their simplest condition, the egg-cell, pass through a long series of developmental stages before they come to resemble their parents from whom they are derived. These developmental stages indicate in crude outline the forms which appeared in succession in the ancestral series. In other words, they recapitulate in a brief manner the forms of the ancestors of the organism in question.

(d) *Vestigial Structures :* Many animals now living possess useless limbs and organs, which are known as vestigial structures. There could have been no point in endowing them with these parts, if they had been created separately. The whale, for instance, has the skeletal remains of a backleg, showing that it is the descendent of a land animal, which possessed legs. Some snakes have vestigial legs, with a claw projecting from the skin, indicating that they have descended from a four-legged reptile living on land as well as in water.

From the facts of palaeontology, comparative anatomy, embryology and vestigial structures, it is evident that the existing organisms are probably derived from the first living substance by a process of Evolution and Natural Selection, as postulated by Darwin.

Darwin's theory of Evolution enables us to link together many facts which are based on observation and we realise that the multitudes of living forms, which are found in the world today, were not separately created but were evolved out of similar forms. It gives a rational explanation as to how one creature is realated to the others, and takes us ultimately to the earliest phase when life originated from one primeval source.

DIVINE ORIGIN OF LIFE

The pursuit of science beyond a certain point leads us to the realm of Metaphysics. Everything in fact that a scientist discovers has a spiritual meaning. For instance, a small grain of dust, which is barely visible, consists of millions of molecules and atoms, which possess any amount of energy. Where has all this come from ? The more deeply we study nature, the more profoundly we are impressed by the laws, which are so accurate and universal in their application. All this is the handiwork of a Higher Power, whom we call God, and we admire Him all the more for it.

There is unfortunately some tendency nowadays to regard science as something, which is quite separate from the

Humanities. There is actually no need for such a conception. Natural science and the Humanities are complimentary to each other and there should be no division between them. There were periods in the history of civilization, when such divisions did not exist. This was so in the days of the old Indian and Greek civilizations. The divergence occurred later, when a study of matter and nature was considered something inherently different from a consideration of the Divine. It is true that the study of natural science takes us into the realm of Reality, and we reach there by a process of observation and experiment; but to arrive at the ultimate Truth a link between Science and the Humanities is inevitable and highly desirable.

In this connection, I shall briefly refer to the views of two eminent scientists, Sir Isaac Newton and Erwin Schrodinger.

Sir Isaac Newton (1642-1727) was a great pioneer in bringing about a critical change in the mode of human thought three centuries ago. He was a great physicist and mathematician. He graduated from Trinity College, Cambridge, in 1665, and in the following year, 1666, he observed the fall of an apple, which suggested to him the law of Gravitation, which is universal in its application. It would be interesting to know his views on the 'Creation of Matter', which is closely connected with the 'Origin of Life'. He said that after considering all things, it seemed probable to him that God in the beginning formed matter in solid, impenetrable, movable particles: of such sizes and figures and with such proportion in space, as most conducive to the end for which He formed them: and that these primitive particles being solids are incomparably harder than any porous bodies compounded of them: even so very hard as never to wear or break in Pieces: no ordinary power being able to divide what God himself made One in the first creation. While the particles continue entire, they may compose bodies of one and the same texture in all ages: but should they wear away or break in pieces, the nature of things depending on them would be changed. Water and Earth, composed of old worn particles and fragments, could not be of the same nature and texture now, with water and earth composed of entire particles in the beginning. And therefore in order that nature may be lasting, the changes of corporeal things are to be placed only in the various separations of new associations and motion of these permanent particles, compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together and only in new places.

These particles, Newton says, are moved by certain active forces, such as those of Gravity, magnetic and electric attraction, and those forces which cause fermentation and the cohesion of bodies. He also suggests the existence of an intelligent Agent, who was associated with the first creation. This is God, Who is able to create particles of matter of several sizes and figures, and in several proportions to space, and of different densities and forces. God is thus able to vary the laws of nature and make worlds of several sorts and several parts of the universe. To this hypothesis, Newton adds the significant word 'At least I see nothing of contradiction in all this.'

Newton was a great believer in the scientific methods of observation and experiment, and in drawing general conclusions from them by induction. This is the method by which progress can be made in Natural Philosophy; and he says that if Natural Philosophy by pursuing this method shall at length be perfected in all its parts, the bounds of Moral Philosophy will also be enlarged. Newton was a profound believer in God. He believed that in Nature God revealed himself. He felt that all his discoveries were one proof of the existence of God. A profound belief in God is thus not inconsistent with the Scientific spirit.

Erwin Schrödinger, a modern physicist, has written a book entitled 'What is Life?', in which he has clearly stated how the working of an organism requires exact physical laws. Physical laws rest on atomic statistics and are, therefore, only approximate. Their precision is based on the large number of atoms intervening. To the question 'Is life based on the laws of Physics?' he gives the answer:

> From all we have learnt about the structure of living matter, we must be prepared to find it working in a manner that cannot be reduced to the ordinary laws of physics. And that not on the ground that there is any 'new force' or what not, directing the behaviour of the single atoms within a living organism, but because the construction is different from anything we have yet tested in the physical laboratory.

To the physicist, he says, this state of affairs is most exciting: but it is unprecedented. In biology, a single group of atoms existing only in one body produces orderly events marvellously turned in with each other and with the environment according to most subtle laws.

He goes a step further and hints at some philosophical implications of the scientific viewpoint. Assuming that the body functions as a pure mechanism according to the laws of nature, yet, it is the experience of all of us that we have what we may call 'Free will', according to which we direct our movements and our conduct, and he says:

> From the early, great Upanishads, the recognition of Athman Brahman (the personal self equals the omnipresent all-comprehending eternal self) was in Indian thought considered, far from being blasphemous, to represent the quintessence of deepest sight into the happenings of the World. The striving of all the scholars of Vedanta was, after having learnt to pronounce with their lips, really to assimilate in their minds this grandest of all thought.

Schopenhauer was also a great protagonist of this ideology.

I have given you the views of Sir Isaac Newton and those of Erwin Schrodinger mainly to show that great physicists themselves after a certain stage, not satisfied with the explanation of natural phenomenon by means of the known laws of Nature, have to look up to the Divine Source for their correct understanding. It is felt by most scientists today that a wholesome synthesis of different branches of knowledge is essential, so that we may have a correct understanding of the various events in the Universe. This is particularly important in an understanding of the Origin and Nature of life.

THE SCRIPTURES

All religions teach that God created the world including the life that prevails here. I shall refer briefly to the old Testament and the *Bhagvad-Gita*.

1. In Genesis or the First Book of Moses, which is a part of the Old Testament, it is stated that it was God Who on Earth created grass, the herb yielding seed, the fruit tree yielding fruit. From the waters, He created great whales and every living creature that moveth. He also created every winged fowl, cattle, and everything that creepeth upon the Earth and all the beasts of the Earth. And finally He created Man in His own image.

2. In Chapter XIII of the *Bhagvad-Gita* (Song Celestial) Bhagvan Krishna says :

> Wherever, Indian Prince !
> Life is—of moving things, or things unmoved,
> Plant or still seed—know, what is there hath grown
> By bond of Matter and of Spirit: Know
> He sees indeed who sees in all alike
> The living, lordly soul: the Soul Supreme,
> Imperishable amid the Perishing:
> For, whoso thus beholds, in every place,
> In every form, the same, one, Living Life,
> Doth no more wrongfulness unto himself,
> But goes the highest road which brings to bliss.
> Seeing, he sees, indeed, who sees that works
> Are Nature's wont for Soul to practise by
> Acting, yet not the agent: sees the mass
> Of separate living things—each of its kind—
> Issue from One, and blend again to One:
> Then hath he BRAHMA, he attains.

This indeed is the quintessence of deepest human thought.

Brahma is beautifully described by Dr. S. Radhakrishnan as the supracosmic, eternal, spaceless and timeless, Who supports this cosmic manifestation in space and time. He is the universal spirit, Paramatman, Who ensouls the cosmic forms and movements. He is the Paramesvara, Who presides over the individual souls and movements of nature, and controls the cosmic becoming. He is also the Purushottama, the supreme person, Whose dual nature is manifested in the evolution of cosmos. He fills our becoming, illumines our understanding, and sets in motion its hidden springs.

CONCLUDING REMARKS

This is a brief and very incomplete review of some of the views held regarding the nature of life and its origin on this Earth.

As interplanetary flights have now commenced, it is likely that we shall gradually obtain some knowledge of the environmental conditions prevailing in different planets, as well as the presence or absence of life there. We shall also know how life there differs from life on this Earth. This will furnish us with useful information, which may help us to frame a more definite hypothesis as to the origin of life here.

Speaking from a physiological point of view, according to Bernal, there are three main characteristics of Life, namely:

(a) Living organisms are coherent, i.e. they are restricted in position.

(b) They have a dynamic stability and exhibit a turnover of material. They are in pseudo-equilibrium with the environment, but are not in thermodynamic equilibrium.

(c) In them, synthesis exceeds break-down leading to growth and reproduction.

All these phenomena are the result of metabolism, and great importance is to be attached to the metabolic characteristics of living matter.

As regards the origin of life on Earth, I agree to the views of Bernal when he says that it consisted of a Prologue and Three Acts.

The Prologue is the appearance of inorganic compounds on Earth, and the three Acts are:

(1) Accumulation of chemical substances with a stable process of conversion set up between them, called *Life*.
(2) Specialisation and stabilisation with a freeing from dependence on anything but sunlight.
(3) Evolution of photosynthesis and respiration.

There is no doubt that solar radiation played a great part in the origin and maintenance of life on Earth, and specifically in the formation of complex molecules. Energy is concentrated in sunlight and available for synthesis, particularly ultra-violet radiation, electrical discharge, and radiation from radioactive matter. The way in which this energy is used is determined by pressure, by temperature and by catalysts.

It would appear that Life originated in the sea from a large number of molecules, which ultimately achieved stability. From the sea, life came to the land. Having once appeared, its further development was rapid. It assumed various forms by a process of Evolution and Natural Selection.

The question still arises, where did this stable process of conversion set up in the chemical substances, which I have just referred to as Life, come from ? The answer to this is supplied by the *Bhagvad-Gita.* Life is created by a bond of matter and spirit, and it is Brahma Who supports and presides over all cosmic manifestation in time and space. This is as far as we can go at present.

In considering the subject of 'Origin of Life' one often wonders what the purpose of life is. This opens up another wide subject, but I shall briefly answer it thus :

Thy work with beauty crown, Thy life with love:
Thy mind with Truth uplift to God above;
From whom all is, from whom was all begun,
In whom all Beauty, Truth and Love are one.

CHAPTER IX

ON MAITRI*

WE have assembled here today to participate in the 2503 Buddha-Jayanti World Concord Celeberations. I consider it a great honour and privilege to speak on this great occasion, and offer my sincere thanks for it. Our thoughts go back to Gautam Buddha, whose teachings were so full of compassion and loving kindness, serving as a soothing balm to all humanity and giving them new hope and joy. Compassion and loving kindness are the very essence of *Maitri*, which is the subject of today's symposium.

Gautam Buddha is deeply enshrined in the hearts of all of us. The fundamental emphasis in His teachings was on treating all life with respect, not causing harm to any one.

Every great religion has a central idea, on which rests its whole philosophy of life. With Christianity it is Charity and obedience to the Commandments of God; with Hinduism, Realisation—Realisation of the Supreme Being as well as self-realisation; with Judaism, Law; with Zorastrianism, Purity; with Islam, Faith; and with Buddhism, Compassion and Love and how to obtain relief from suffering and pain.

The Buddha was born under the Sal tree in Lumbini Park in the neighbourhood of Kapilavastu, which is near the border of Nepal. As he grew up, the sight of old age, disease and death affected the young Siddhartha deeply. He subsequently renounced all family ties and retired to the forests to seek enlightenment, to find the cause of sorrow and suffering, and the means of alleviating them. When he found that sorrow and suffering oppressed all mankind, he was overcome by compassion. He preached the Four great Truths and the Noble Eightfold path. He collected disciples around him and taught his doctrines of love and compassion. He advised that men in order to be happy must get rid of all hatred and malice, all indulgences in lower desires, all lying and evil thoughts. Let them substitute good thoughts and worthy desires, feelings of Charity and compassion and be serene and composed. He showed in his own life the effects of the practice of his precepts. He taught what was practical and reasonable. He has exerted a mighty influence for good on the culture and civilization of the human race, especially in Asia.

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* An Address delivered at the Maha-Bodhi Society, Bangalore, during the 2503 Buddha-Jayanti World Concord Celebrations at the World Concord Meeting on 23rd May 1959.

Like Lord Jesus Christ, Lord Buddha left no written records. But whatever he said made a deep and lasting impression on the minds of his listeners, who passed on the teachings of the Master to their successors. His followers wrote down conscientiously what they had heard. These writings comprise the main source of inspiration for us today. His words travelled to many lands and transformed the lives of the peoples.

The Buddha had schooled himself to strict discipline, and through that self-discipline there emerged rare sweetness which imprinted itself on the minds of the people who came in contact with him. The Buddha is depicted through the ages seated in a calm manner gently smiling upon mankind and the world around him. That smile, so full of compassion and loving kindness, is there for all time.

Today we pay due reverence and homage to Gautam Buddha, the greatest son of our land, and remind ourselves of the noble message which he preached for the good of all humanity.

In a voice full of divine grace and earnestness, he exhorts us across the centuries and says :

1. Overcome anger by loving kindness, evil by good,
   Overcome stinginess by generosity, and falsehood by truth.
2. Victory breeds hatred; the defeated live in pain,
   Happily the peaceful live, giving up victory and defeat.
3. One should give up anger, one should renounce pride.
   One should overcome all fetters. Ills never befall him,
   Who clings not to mind and body and is passionless.
4. Easily seen are other's faults,
   But hard indeed to see are one's own.

Like chaff one winnows other's faults,
But one's own one hides like a crafty fowler covers himself.
(*Dhammapada*)

These noble words so full of wisdom and compassion contain the very essence of *Maitri*, of goodwill and of friendliness, and it will be well if all the individuals as well as the nations on Earth pay due heed to them, as they will help them to resolve all mutual conflicts and animosities.

In Buddha's teachings, *Maitri* or loving kindness finds the first place in the four kinds of contemplation necessary to exercise the proper relationship with other living beings. They are *Maitri* or loving kindness, *Karuna* or compassion, *Mudita* or gladness at other's success, and *Upeksha* or equanimity. These four stages are known as *Brahma-Vihara*.

How to achieve and practise the principles contained in this sublime doctrine of *Maitri* is the main question. In this connection, I may remind you of the words of the *Dhammapada*, which will help us :

1. Mind is the forerunner of all good conditions. Mind is Chief and they are mind-made. If with a pure mind one speaks or acts, then happiness follows one, even as the shadow that never leaves.

2. Should a person perform good, he should perform again and again; he should find pleasure therein, for blissful is the accumulation of good.

3. Not to be evil,
To cultivate good,
To purify one's mind.
This is the advice of the Buddha.

These discourses and teachings of Gautam Buddha have a modern trend about them. He is rational in his outlook and best suited to guide us today. All individuals and nations will do well to listen to him attentively, for the salvation of our civilisation and the human race depends on this.

We are passing through that phase of human history, known as the Age of Science, which began its fruitful career about 300 years ago, with the onset of the Renaissance in Europe. Since then there has been a progressive subjugation of nature. There was first the Steam Engine, which has been replaced by the Dynamo. Radiant energy has revealed the hidden secrets of nature. The conquest of the Earth has been accompanied by the mastery of the Sea and the control of the Air, so that distance has been annihilated and communications have been accelerated beyond all expectations. That is not all. As a medical man, I can say that epidemics of many diseases have been checked. We have more effective weapons, both medical and surgical, for curing quite a number of diseases. The general standard of health has improved, and the expectation of life has been lengthened. Besides, the means of industrial production have improved, and there is an all-round betterment in the economic condition of the people. This is all due to the scientific and industrial revolution, which has taken place.

There is, however, a dark side to this picture. Some of us during our life-time have witnessed two World Wars of unprecedented magnitude, and even today there is no peace amongst the nations. The atmosphere is surcharged with international mistrust and ill-will. Science, in spite of the great progress it has made, has provided no satisfactory remedy for this. On the contrary, the misuse of Science for Military and Political ends has created world-wide fear and a sense of insecurity. This is due to the cleavage which has occurred between Science and the Humanities, between Science and Religion. It is our duty to repair this cleavage, and prevent the impending disaster. This can be done by the practice of the principles of *Maitri*.

It is essential that goodwill and loving kindness should prevail among the nations as among individuals. For this purpose a complete change of heart is necessary. In all our actions we are and should be guided by our conscience, in which are enshrined all the highest ethical and moral principles including the principles of *Maitri*. There is need for a proper synthesis between science and these ethical principles; and such a synthesis should guide the actions of individuals as well as nations. The conscience of the individual should thus become the conscience of humanity, promoting goodwill and loving kindness amongst all and removing hatred and animosity.

I am very happy to see around me here very distinguished representatives of different religions and schools of thought, gathered together to do honour to Gautam Buddha. No better evidence of mutual goodwill and tolerance could be witnessed. This is indeed in keeping with the Indian tradition. Indian history has been distinguished throughout by a tendency towards toleration, synthesis and adaptation. It is a good example of uniformity in diversity. Our cultural heritage is a very composite thing. It is a true synthesis of all that is best in the thought of East and West. So far as the different religions are concerned, it is my firm belief that their fundamental ethical teachings are all the same; and out of these essential fundamentals it is our task to evolve a common religion, a Universal religion, for all humanity. This was also the dream of Rabindranath Tagore, who once said :

> The Civilizations evolved in India or China, Persia or Judea, Greece or Rome, are like several mountain peaks having different altitudes, temperature, flora and fauna and yet belonging to the same chain of hills. There are no absolute barriers of communication between them; their foundation is the same.

At this critical moment in the world's history, people look to India for guidance and leadership. That lead is given by our Gautam Buddha, who through his teachings can bring Asia and the rest of the world together and thus promote peace on Earth. In the truest sense of the word, he is the harbinger and pioneer of the New Renaissance, which is evident today, for he combines in himself the best qualities of a Scientist and a Humanist.

We accept the fact of Scientific progress and all its advantages. And I would urge with all the emphasis at my command that we in this country should pursue the study of Science with all the energy and resources at our command. It is, however, imperative that Science should be integrated with the philosophy of Love and Compassion preached by Gautam Buddha, if we are to avert the disaster, which threatens mankind.

Says Gautam Buddha :

> Do not deceive each other, do not despise anybody anywhere, never in anger wish anyone to suffer through your body, your words or thoughts. Like a mother maintaining her only son, with her life; keep thy immeasurable loving thought for all creatures.
>
> Above thee, below thee, on all sides of thee, keep on all the world thy sympathy and immeasurable loving thought, which is without obstruction, without any wish to injure, without enmity.
>
> To be dwelling in such contemplation while standing, walking, sitting or lying down, until sleep overcomes thee, is called living in Brahma.

On this Buddha-Jayanti Day, let us pray that Lord Buddha may bless us all, and shower His sublime gifts of love, compassion, kindness, friendliness and benevolence on the entire human race in order that we may overcome and avoid all mutual conflicts and strifes and thus promote Happiness, Concord and Peace on this Earth.

CHAPTER X

CIVILIZATION AT THE CROSSROADS*

TODAY we are passing through a critical phase in human history. We witness a steady relaxation of traditions and of the established order of things. The guiding role of religion in life, in our daily conduct, is becoming less and less prominent. There is misunderstanding and bitterness all around. Suspicion, uncertainty and fear prevail in the international as well as in the national spheres. During the lifetime of some of us, two world wars have been waged with unprecedented grimness, and the vision of a third world war of a still greater magnitude and virulence stares us in the face all the time. Everywhere around us there are signs of revolutionary social and political changes. The world is divided into two opposite camps on the basis of their different ideologies, which they are anxious to guard, protect and preserve at any cost, and with this object they are arming themselves on an ever-increasing scale. We are anxious, and have misgivings as to where all this is leading us. With all humility I am constrained to remark that the human race may be annihilated by its own acts prompted by the stupidity and selfishness so firmly enthroned in the human mind.

If we are not careful enough and do not deliberately check the unwholesome and unhealthy tendencies that exist, we may be forced to plunge headlong into an era of utter darkness and barbarity. It would mean the destruction of all those fine accomplishments in physical, mental and spiritual domains which we are pleased to call civilization. Civilization is truly at the crossroads. Which way is it to turn? Any false step at this juncture may result in irretrievable disaster and ruin. The challenge to us of this generation is to ensure that this catastrophe shall not occur.

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This is the age of science. Science is immensely useful, and it should be used for the welfare of mankind, as for instance in eliminating disease and raising the standard of health, supplying rapid means of communication and beautifying life generally. We are making fresh scientific experiments in every field, and this work should continue with ever-increasing zeal and efficiency. But scientific discoveries are not always used for the welfare of humanity, but often for its destruction. The atomic age fills us with horror. The fact is that some scientists are tied to the chariot wheels of the State, and it is the politicians who finally decide to what purpose new knowledge should be put. A close integration of science and the humanities in all corners of the earth and a better appreciation of ethical values may help to change this disastrous situation.

Bertrand Russell, the well-known British philosopher, who has been solemnly and persistently asking for nuclear disarmament, warned us only last month, saying:

> Most people in this country (England) as well as in other countries appear to be unaware that the governments of East and West are solemnly preparing by mutual vituperation to create a general state of mind, in which the public will acquiesce in a large-scale nuclear war.
>
> A nuclear war would wipe out Europe completely and North America as a component civilization.
>
> If it were not happening, I should have thought it inconceivable that Ministers calmly contemplate this wanton and merciless disaster. Yet it is so.
>
> Statements have recently been made on both sides of the Iron Curtain, claiming that in a nuclear war the side to which the speaker belonged might achieve victory. This is utter nonsense, and must be known to be nonsense by those who utter it, unless they are criminally ignorant of things which it is their duty to know. The peril is imminent and deadly.
>
> Before the end of the year we may all be dead—you, your children if you have any, your wife or husband, your friends and all, that make up the population of your neighbourhood and your country.
>
> If you do nothing during the coming weeks of crisis you will

have your share in the blame. You will have your part in the crime of killing all those whom you care for.

The Governments can be stopped in their mad folly, but they can only be stopped by a vast movement of protest, in which all sane men and women must take part.

The time may be short. Action must be now or it may be too late.

The one thing for which we must stand is that the differences between East and West, whether about Berlin or any other issue, must be settled by negotiation and not by war—for war in the nuclear age can leave nothing standing that either side could possibly desire.

Bertrand Russell called upon the people of the world to rise in a vast protest with the cry 'Negotiation, not War.'

> 'It is your duty in this moment of supreme danger to do all that lies in your power to bring some spark of reason and humanity into the minds and hearts of those who control the destinies of East and West,'

he added.

That is the situation at present.

In order to understand the age we live in and the present civilization, it is necessary to have a look at the past.

Civilization, as we usually think of it, emerged only about six or seven thousand years ago. This is a very small period compared with the age of the human race or of the life on this planet, or the age of the *planet* itself or our own solar system or the galaxy of stars of which *it* is nothing more than a grain of dust. I shall not, therefore, start with the beginning of things, but will content myself by recalling that there are certain periods of human history, which stand out markedly as periods of intense cultural change. The sixth and seventh centuries B.C. were a period of great intellectual upsurge in India, China, Babylon, Egypt and Greece. This was the classical period in antiquity, which in Europe after the Roman empire gradually drifted into the Middle Ages, and the Middle Ages passed on through the Renaissance to modern times. The modern period in which we live is influenced by the spirit of science and rationalism, by secular humanism and by the idea of the sovereign nation-state. Today for the first time in history all human beings inhabiting different parts of the earth have become part of one civilization, owing to the rapid development of communications by land, sea and air, Each one of us is to some extent dependent on the rest. We are linked together economically and our political fortunes are also interdependent. In spite of our being drawn so close together physically, we do not feel as if we were one, and there is constant friction and lack of understanding between the nations of the world.

The ancient Greeks laid the foundations of natural science for Europe. It was the ambition of the Greek mind to analyze, explore, test and prove all things in the light of reason. They were the first to attempt to make life rational, and to apply the principles of reason to primitive beliefs. Socrates firmly believed that human nature was fundamentally good and that the spread of enlightenment would abolish all that was wrong and vicious.

The Greeks were not very renowned for their religious fervour. Their main religion was the worship of the Olympian gods, such as Zeus, Pallas Athene, Aphrodite, Hermes and Artemis, each of which represents either human qualities or forces of nature. The Greeks were, however, devoted to their concept of the city-states. The city was the unit of Greek society and claimed the devotion of all its citizens. This patriotism for the city was as a sort of second religion with them.

Greek civilization gave to Europe the habit of disinterested knowledge, but it also left them the legacy of holding patriotism as the highest virtue. With the disappearance of the city-state, Greek patriotism died. Rome, which succeeded Greece, was powerful for a time, but her religion had a special relation to the State. Worship was a public duty. The citizens could have their own private beliefs also so long as they acknowledged the religion of the State. This could not satisfy the immortal longings in man; nor did it impart unity to the State. It was disunity among the provinces that ultimately caused the fall of Rome. It was during the decay of Greco-Roman civilization that Christianity arose. After a period of struggle, it got a firm hold on Europe.

Both Judaism and Christianity take their stand on revelation. Their chief contributions to European thought are an insistence on the insufficiency of the intellectual, the importance of the historical and the great need for the higher spiritual values of life. The Christian view presents a blend of the Greek and Jewish conceptions of the historical The intellectual life of the Middle Ages was devoted to the development of this conception. Thus, Thomas Aquinas in his writings makes an attempt to build a system of Christian theology with the aid of the logic of Aristotle.

During the Middle Ages, Christianity gave to Europe a sense of the Divine power as well as a clue to right conduct. It definitely raised the ethical standards in the land. But at the same time it prevented free enquiry. Then came the Renaissance, which gave to Europe a new civilization based on the three Greek ideals of rationalist philosophy, humanistic ethics, and nationalist politics. It gave back to Europe the free curiosity of the Greek mind as well as the Roman sense of practicality and orderliness. There was a revival of the classics. Science and adventure started their memorable careers in this atmosphere. We had Copernicus and Columbus, Machiavelli and Andreas Vesalius, Luther and Calvin, Galileo and Descartes. The scientific and technological achievements brought different parts of the world in close relation with each other. The philosophical thought of the period was moulded by the protagonists of science. According to them, Truth is contained only in that which can be recognized by us. Mathematics is the great example of truth. Spinoza says:

Truth would have been eternally hidden from the human race, had not mathematics, which deals not with ends but with the nature and properties of figures, shown to man another norm of truth.

Mankind is slower to move and acquire new modes of thought than many of us imagine. An important feature of the Renaissance was that a society divided into the lay and the clerical gave place to one divided into the rich and the poor; and an atmosphere hostile to free enquiry gave place to one in which science could live and flourish. During the Middle Ages the Church was the sole repository of culture. The training was mostly in sacred texts and no new knowledge was acquired. The study of natural science was at a discount. The change took place in the sixteenth and seventeenth centuries. Men began to study nature. Painters examined the human frame and surgeons dissected it. The new knowledge had no connection with Theology.

With a sharp gesture of impatience (says H. A. L. Fisher), Europe turned away from the vast literature of commentaries and glossaries, which the pedants of the later Middle Ages had inscribed "in letters of opium on tablets of lead".

The invention of printing in the fifteenth century made possible the diffusion of knowledge to a large mass of people by means of books.

All this gave rise to consequences which were far-reaching and unexpected. Quite unconsciously and gradually mankind acquired a new attitude towards knowledge. They felt that the past was no longer supreme; and authority, so far as knowledge was concerned, no longer went unchallenged. Truth was no longer simply that which was given in ancient books, but something they must discover and prove for themselves.

It was also about this time that there emerged in Europe the form of social and political grouping which we call the 'nation'. Europe was split into a number of national groups, among which, unfortunately, there was considerable rivalry and friction. A spirit of national pride and independence prevailed, and diplomacy was surcharged with the notion of a balance of power between nations. Ultimately this idea of nationhood became all-important.

All this has been continuing with ever-increasing vigour during the last three hundred years, but the progress made in the first half of the twentieth century has been on such a tremendous scale as was undreamt of by any previous generation. Europe has been beautifully summarized by H. A. L. Fisher:

> . . . the life-giving inrush of the Aryan peoples, the flowering of the Greek genius, the long Roman peace, the cleansing tide of Christian ethics, the slow reconquest of classical learning after the barbaric invasions, the discovery through oceanic travel of the new world, the rationalism of the eighteenth, the philanthropy and science of the nineteenth centuries.

The present phase of our civilization is the direct outcome of the Renaissance, which originally commenced in Europe, and later affected the rest of the world. Every civilization is an experiment in life, and when found wanting it is discarded. Nature then starts a new experiment with a different pattern. But the knowledge gained by the previous experiments is not lost. The wisdom and knowledge of the past enters into a new garb and inspires the further gradual evolution towards the purpose of history. The fact of progress is writ plain and large on the page of history, but progress is not a continuous process. The ground gained by one generation may be lost by the next. The thoughts of men may flow into channels that lead to disaster and barbarism.

Besides Greece and Rome, there were other areas, as I said before, where civilization had reached a very high level: Egypt, Babylon, India, China and Persia participated in this supreme adventure of the ages. History shows that their cultures were not isolated phenomena, but influenced one another in various ways. Of the living non-European civilizations, the most important are the Islamic, the Hindu and the Chinese. The Islamic has the same historical background as Judaism and Christianity. The humanist civilization of China was considerably influenced by the religious conceptions of India, especially the Buddhist. In India religion has been the chief interest of the Hindu mind. But Hinduism has not been so well known in Western countries as Christianity, Judaism and Islam.

Hinduism adopts what is truly a rationalist attitude. Religion is not so much a matter of a revelation to be attained by Faith as of an effort to unveil and pierce into the deepest layers of man's being. Religion is an experience to which the person attaches the highest value. Both Hinduism and Buddhism are alike in this respect. It is more a spiritual experience than a notion of God. As Dr. Radhakrishnan says, real religion can exist without a conception of the Deity, but not without a distinction between the spiritual and the profane, the sacred and the secular. *Bodhi* is the Enlightenment which Buddha attained, and his followers aim at it as an experience. Perfect insight (*Sambodhi*) is the end and aim of the Buddhist Eightfold Path. There are systems of thought like the Sankhya and the Jaina, which affirm the reality of the spiritual consciousness. There are theists, like Ramanuja, for whom the spiritual consciousness, though not itself God, is the only way in which God can be known. Ultimate salvation no doubt is the final attainment of the true status of the individual. Brahma is the principle of search as well as the object sought, the animating ideal and its fulfilment. The striving of the soul for the infinite is said to be Brahma. Our longing for perfection and our urge towards the infinite are the sources of divine revelation. The very fact that we seek God clearly proves that life cannot be without God. God is life; recognition of this fact is spiritual consciousness.

To be spiritual is not to reject reason but to go beyond it. Philosophy and religion are two aspects of the same movement. To be religious is the natural development of a really human life. Truth, beauty, peace and wisdom are all its attributes.

Civilization today is confronted with a possible collapse. The world is partitioned between two great powers, headed by the United States and the Soviet Union, which cherish different ideologies that seem to be irreconcilable. And war in the nuclear age is capable of untold havoc. Along what path are we to look for the salvation of the human race?

It is observed that when a civilization declines, there is the rise of a new religion. Thus in the sufferings of the disintegrating Greco-Roman world, Christianity grew and spread. In the Far East, the Tsin and Hun Empires played the part of the Roman Empire, while the same phenomenon is observed with the rise of Buddhism in India. It would appear that the death of one civilization gives birth to another civilization. But there is some purpose behind it all:

> While civilizations rise and fall, and in the falling give rise to others, some purposeful enterprise (Arnold Toynbee says) higher than theirs, may all the time be making headway, and in a divine plan, the learning that comes through suffering, caused by the failure of civilization, may be the sovereign means of progress.

At the present critical stage, there are two important steps that we should take, namely (1) to see that our education imparts training in the proper direction and (2) to try and create a synthesis of science and religion.

Education should not be given only to impart information on various subjects and to train young people for different professions. Its purpose should also be to make them civilized in the truest sense of the word. It should teach them habits of good behaviour, so that they become dignified and good human beings, and look upon other men, whatever their caste, creed, race, nation or religion may be, with fellow-feeling and respect. Parents, for their part, must see that the child is suitably cared for and trained, and made secure in an atmosphere of mutual love and affection in and around the home. This is vitally important, from infancy onwards. Schools, colleges and universities must organize their curricula to lay due stress on training in the humanities. Technological education, of course, is necessary, and should be developed in this country with all the resources at our command, for on this depends improvement on the economic life of the people. But it is not enough. It is not enough to be technically civilized, for man does not live by bread alone. This applies to all countries at the present day. We as human beings must be kind-hearted; we must look upon problems that trouble other people as our own problems. We must exercise tolerance and charity towards all, as members of the human race and not of this or that community, nation or religious group.

Most of the trouble in the world has been due to men's inhumanity towards other men of different ideologies or religious beliefs or in a struggle for economic or political power. So far as our own country is concerned, I do sincerely hope that educational authorities will rise to the occasion and contribute to the building of a new order of society and new civilization.

Education has not yet succeeded in removing animosity and hatred from the minds of individuals and nations. It is the task of education to train the minds of men in such a way that they understand and tolerate each other. It is only thus that there can be any amelioration of the present dangerous situation in the world. The present atmosphere of cold war is but the shadow of mutual fear and hatred. A revolutionary change has become noticeable in the sphere of religion, especially in the United States and Europe. There appears to be a more sympathetic understanding of the different religions of the world. Judaism, Christianity and Islam are, of course, well known in Western countries, but now, owing to the work of certain scholars, these countries are getting to know more and more of Hinduism and Buddhism. Such studies are an increasing force in the West, and there are many signs of their new influence.

In India the position is slightly different. Here we have had all these faiths for centuries and by a process of toleration and synthesis we have evolved a philosophy of life, which is a blend of all these. India, thus, is in a happy position to give the world a lead in the sphere of religious toleration and mutual understanding.

Humanity has to learn that there is a fundamental unity of all religions, for they all lead us to the same goal, and that the ethical principles propounded by them all are the same. For instance, as Dr. Radhakrishnan has shown, Hindu theology can find a place for Christian theism. A deep enquiry into the philosophy of religion as a factor in human thought is necessary; for it will bring about harmony and mutual understanding, without any claim to superiority.

We should realize besides that the days of conflict between religion and science are rapidly passing away. There is no need for such a conflict. Both are essential for mankind's growth to its full mental and spiritual stature. One without the other would lead us to disaster and ruin. We hear of talks on the suspens in of nuclear tests and weapons, which come to no satisfactory conclusion even though the participants know that the alternative is unimaginable destruction. These failures are due to mutual fear and hatred. There is urgent need for a change towards making a spiritual and humanitarian approach to these problems. We have to construct a bridge across the gap that exists between science and the humanities. In our Indian tradition, this constructive approach already exists, and we should do all we can to present it for the good of humanity at this crisis. For example I may mention that Dr. Jagadish Chandra Bose, the renowned Indian scientist, was a harmonious blend of science, art and religion. So is our distinguished scientist Sir C. V. Raman.

As Professor A. V. Hill rightly says,

> The so-called conflict between science and religion is usually about words, too often the words of their unbalanced advocates; the reality lies somewhere in between.

'Completeness and dignity,' to use Tyndall's phrase,

> are brought to man by three main channels, first by the religious sentiment and its embodiment in ethical principles; secondly by the influence of what is beautiful in nature, human personality and Art; and thirdly by the pursuit of scientific truth, and its resolute use in improving human life.

The history of human civilizations shows that fundamentally there is the same pattern in all, although there are some variations according to geographic, climatic and cultural differences.

Although history often repeats itself, this tendency towards repetition is one of the devices of the creative faculty, and it is for us to devise means to avoid catastrophe. What shall we do to save the situation? This is what we may plan to do:

> In politics, establish a co-operative system of world government. In economics, find a working compromise (varying according to the practical requirements of different places and times) between free enterprise and socialism. In the life of the spirit, put the secular superstructure back into religious foundations.
> (Arnold Toynbee)

If we did all this we might be sure that we should succeed in saving our civilization.

On the political side, apart from other measures, we must give the fullest support to the existing international organizations, such as the UNO, UNICEF, WHO, UNESCO, FAO and others. They are all trying their best to bring about international goodwill and understanding. Through their efforts we are trying to build one world, but the goal is still very far off; for there is no proper understanding between man and man.

It is a happy sign of the times that we have an organization here, the Indian Institute of World Culture, which takes equal interest in all cultures of the East and the West and in promoting goodwill and friendship amongst all the peoples of the world, irrespective of their race, nation, caste or creed. This is indeed a noble task in which I wish the Institute the best of success.

Of the three steps mentioned above, the spiritual task is by far the most important, for it is only through this that the hearts of men can be changed, which would result in mutual goodwill and peace. The great benefactors of mankind are such teachers as Gautama Buddha, Krishna, Jesus Christ, Confucius, Mohammad, Zoroaster, the Prophets of Israel and Judah, and Socrates. If by any chance the existing civilization perished, the names of these benefactors would survive, and they may still bring some comfort and hope amidst the disaster that will result.

A close study of history leads us to theology, and we wonder what the ultimate goal is towards which civilized humanity is drifting by fits and starts. The answer is given by the study of theology, which also furnishes us with the highest ethical principles, which should guide mankind in its passage through this earthly existence.

At this difficult moment in the history of the world let us turn to the messages of some of the higher religions of the world. May I invite your attention to some sayings of the *Bhagavad-Gita*, of Jesus Christ and of Gautama Buddha ?

In the *Bhagavad-Gita*, Chapter XVI, Krishna says:

> Fearlessness, purity of mind, steadfastness in knowledge and concentration, charity, self-control and sacrifice, study of the scriptures, austerity and uprightness.
>
> Non-violence, truth, freedom from anger, renunciation, tranquillity, aversion to fault-finding, compassion to living beings, freedom from covetousness, gentleness, modesty and steadiness (absence of fickleness).
>
> Vigour, forgiveness, fortitude, purity, freedom from malice and excessive pride—these, O Pandava (Arjuna), are the endowments of him who is born with the divine nature.
>
> (Verses 1-3. Trs. by S. Radhakrishnan)

Says Jesus Christ in his Sermon on the Mount:

> Judge not, that ye be not judged

For with what judgment ye judge, ye shall be judged: and with what measure ye mete, it shall be measured to you again.

And why beholdest thou the mote that is in thy brother's eye, but considerest not the beam that is in thine own eye?

Or how wilt thou say to thy brother, Let me pull out the mote out of thine eye; and, behold, a beam *is* in thine own eye?

Thou hypocrite, first cast out the beam out of thine own eye; and then shalt thou see clearly to cast out the mote out of thy brother's eye.

Says Gautama Buddha:

"He abused me, he struck me, he overpowered me and he robbed me"—those who harbour such thoughts do not still their hatred.

"He abused me, he struck me, he overpowered me and he robbed me"—those who do not harbour such thoughts still their hatred.

For hatred is never appeased by hatred in this world, by non-hatred alone is hatred appeased. This is the law eternal.
(*Dhammapada*, Verses 3-5)

These are undoubtedly some of the highest ethical teachings. Similar teachings were given by Mohammad and other religious teachers. Nations as well as individuals need to take note of them, and follow them in their daily life and conduct.

In this critical stage of the world, I cannot emphasize too strongly that humanity should seek guidance from its spiritual teachers. It is only in this way that we can overcome enmity and hatred and develop towards our neighbours love and understanding. We must realize that above and within us all there is a higher power, which we call God, which blesses us and loves us all. So why should not we, God's children, love instead of killing one another?

In this campaign to promote mutual trust and fellow-feeling the two weapons which are of paramount importance are *Charity* and *Humility*. These must be the basic rock on which we build the edifice of moral conduct. Faith in the God we seem to have forgotten must be revived. It will be a light to us in the dark path amid which we are stumbling. I appeal especially to politicians and rulers, who guide the destinies of nations to seek charity, compassion, humility and mutual understanding, and so steer clear of the course which would inevitably wreck us on the hardness of our hearts.

This is the choice that civilization has to make at the crossroads, if it is to survive and fulfil its mission of promoting wisdom, peace and happiness in the world. I do believe that where there is life there is hope, and that, with God's help, man is still the master of his own destiny.

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